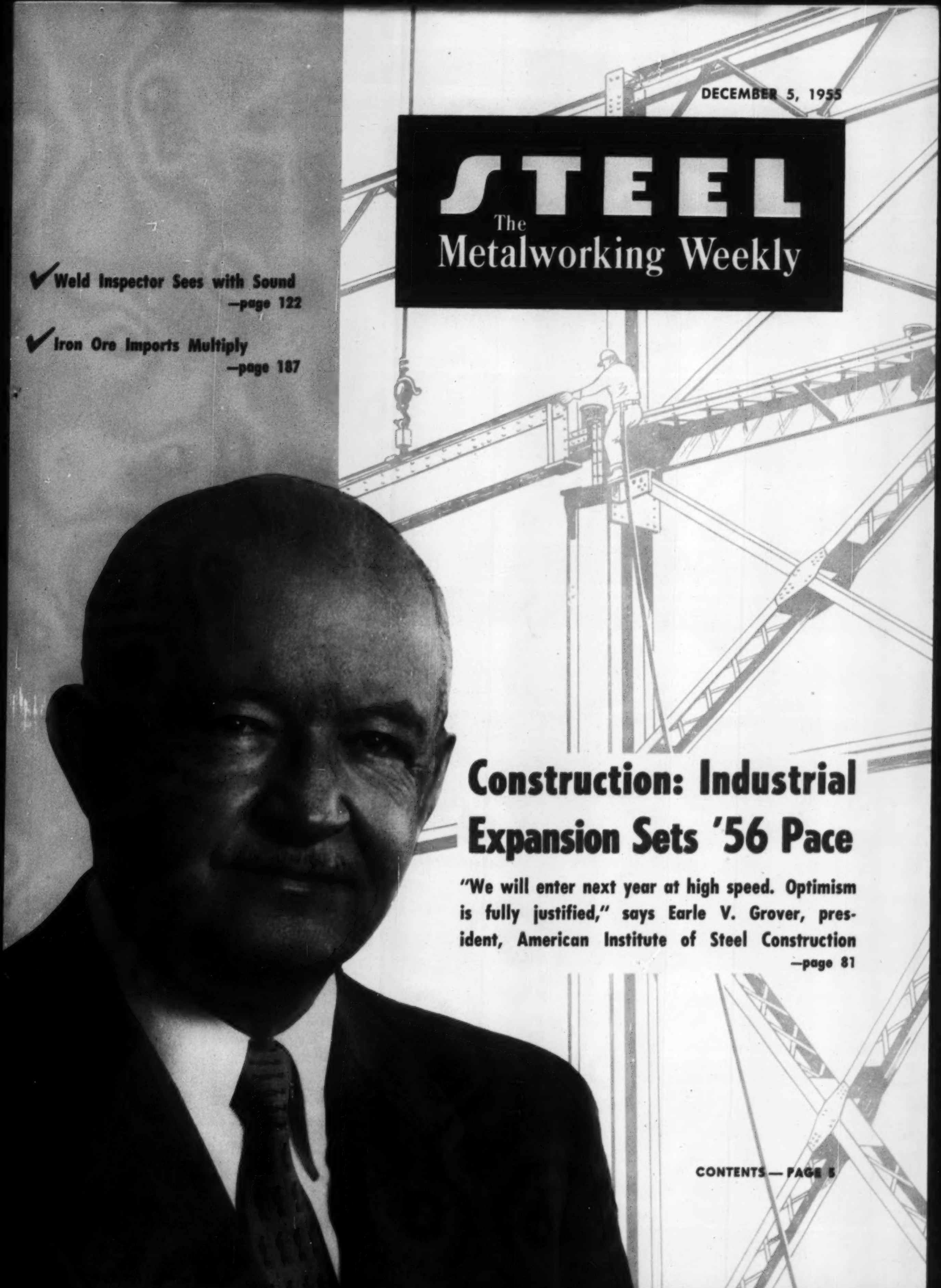


DECEMBER 5, 1955

STEEL
The
Metalworking Weekly

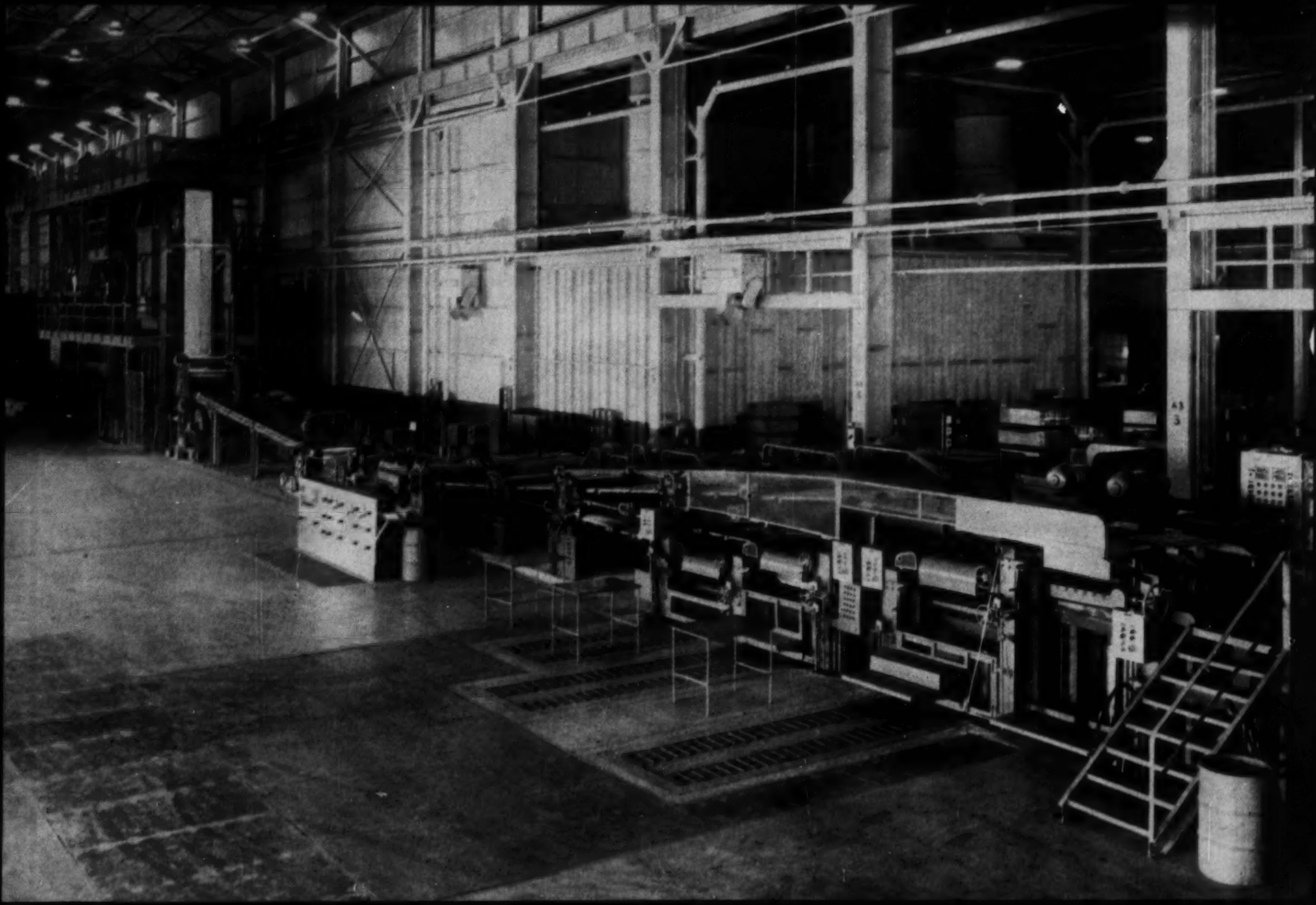
✓Weld Inspector Sees with Sound
—page 122

✓Iron Ore Imports Multiply
—page 187

Construction: Industrial Expansion Sets '56 Pace

"We will enter next year at high speed. Optimism is fully justified," says Earle V. Grover, president, American Institute of Steel Construction
—page 81

CONTENTS — PAGE 5



NEW ELECTROLYTIC TINNING LINE

"Ferrostan" Electrotinning Line Acclaimed

built by **AETNA-STANDARD**

for TENNESSEE COAL & IRON DIVISION, U. S. STEEL CORPORATION

More rugged design, improved Tracking, Shearing and Classifying, Pickling and Cleaning. Line is designed to be the largest capacity, highest speed line of its type to date.

THE AETNA-STANDARD ENGINEERING COMPANY · PITTSBURGH, PA.

Aetna-Standard

PLANTS IN WARREN, OHIO · ELLWOOD CITY, PENNSYLVANIA

GOOD EQUIPMENT BRINGS DOWN
PRODUCTION COSTS

Remember your first sled?

What bigger moment in a youngster's life than when he selects his first sled! Especially if it's a Flexible Flyer, the same kind Dad had, years ago.

Flexible Flyers, made by S. L. Allen Co., Inc., are widely known for quality—quality that starts with those slim steel runners, formed from hot-rolled carbon-steel T-sections. The ones shown here, which were rolled at our Johnstown, Pa., plant, measure 11/16 in. deep by 7/16 in. across, with a 1/16 in.-thick stem. And a slight concavity, or groove, is rolled into the cross bar. Grooved runners grip icy surfaces, preventing skids and giving better control.

S. L. Allen save money by using Bethlehem special sections for their sled runners. They avoid costly machining, forming and fabricating operations—and they get a better product, besides.

A few other typical applications illustrating the widespread uses of Bethlehem special sections are truck tire rims, door hinges, lawn-mower blades, fence posts, window sash, and typewriter-carriage rails. Perhaps you could cut production costs by using special sections, hot-rolled to your drawings and specifications. For complete information we suggest that you contact the Bethlehem office most convenient to you.

A workman at S. L. Allen's Philadelphia plant rivets hardwood bars to the sturdy steel frame.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

IT "THINKS" FOR ITSELF!

HEALD
SIZE-MATIC

new

HEALD MODEL 170 AUTOMATIC CHUCKER
with after-gaging and FEEDBACK holds close size limits automatically

WHAT FEEDBACK MEANS TO YOU

The practical application of feedback to internal grinding and borizing equipment opens a new field for cutting production costs on long-run jobs.

A signal from the after-gaging unit is fed back to the tooling or diamond — automatically correcting any tendency to drift out of size. Feedback limits are well within specified tolerances of the work, thus making any needed corrections *before* parts reach scrap limits.

All this is done without any effort or attention on the part of the operator. That means higher productivity per man-hour — one operator can easily control a greater number of machines. It means that off-size scrap parts are virtually eliminated. It means higher sustained production, with greater accuracy and precision, at *lower cost per part.*

The new, completely automated Heald Model 170 Auto Chucking Size-Matic shown above makes short work of grinding a blind interrupted bore in valve tappet bodies.

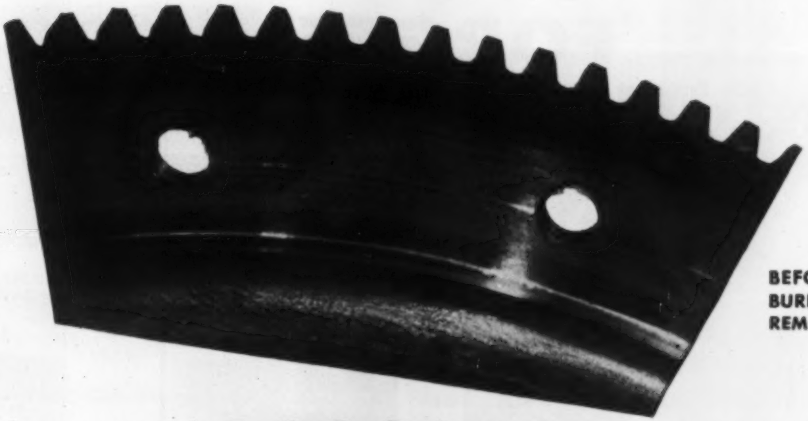
With *automatic* hopper feed, orientation, chucking, cycling and unloading, a net production of 204 pieces per hour at 90% efficiency is consistently maintained. And with after-gaging and feedback, tolerances of .0003 on bore size, .00005 maximum out-of-roundness and .0001 maximum taper are easily held. Feedback enables the machine to detect tendencies toward errors—and correct them automatically, without operator attention.

This is Heald automation at work—bringing you higher production and greater precision than ever before. For the newest advances in internal grinding, rotary surface grinding and borizing — IT PAYS TO COME TO HEALD.

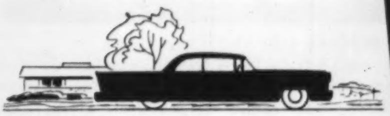
For information on the new 170 Size-Matic, send for Bulletin 2-170-S.

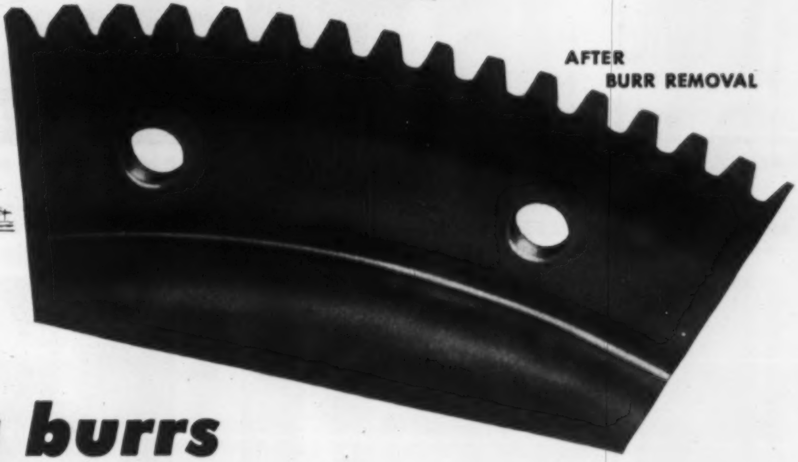
THE HEALD MACHINE COMPANY
Subsidiary of The Cincinnati Milling Machine Co.
Worcester 6, Massachusetts
Chicago • Cleveland • Dayton • Detroit • Indianapolis • New York

HEALD ®



BEFORE
BURR
REMOVAL





AFTER
BURR REMOVAL

Removing burrs for trouble-free transmissions

One of many automatic brushing setups used by automotive manufacturers to finish transmission parts and other components.

BURRS left on automatic transmission parts can break loose in service, clog hydraulic lines and cause serious damage.

The two sections of a transmission cover shown above prove how thoroughly power brushing removes burrs and blends surface junctures . . . leaves the part smooth and clean.

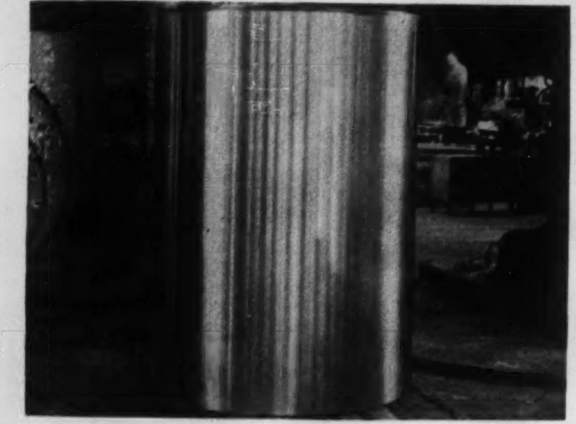
Have an **O**sborn **B**rushing **A**nalysis made of your operations. It costs you nothing, but may save thousands of dollars in your finishing of parts. Write *The Osborn Manufacturing Company, Department G-39, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

Osborn Brushes

OSBORN

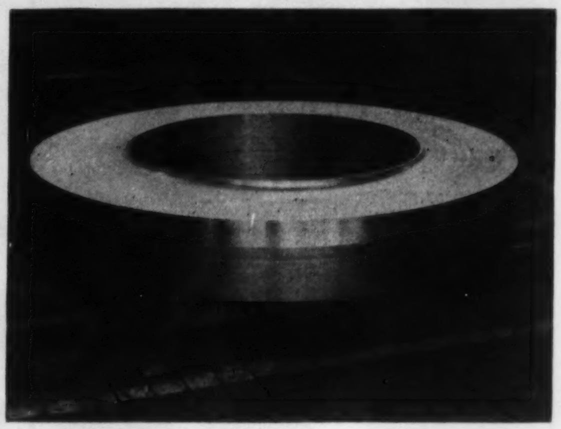
BRUSHING METHODS • POWER, PAINT AND MAINTENANCE BRUSHES
BRUSHING MACHINES • FOUNDRY MOLDING MACHINES

MIDVALE FORGES *SLEEVE* TO STRENGTHEN AIR FORCE ARM



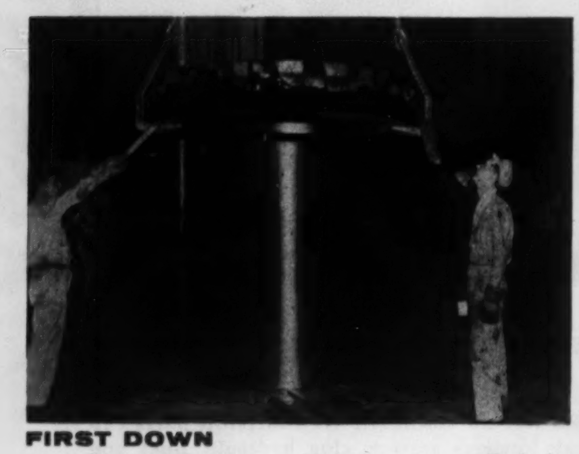
FORGED AND MACHINED SLEEVE

. . . for use in a Loewy-Hydropress 8,000-ton extrusion press for producing aluminum aircraft sections . . . has a length of 65" and a 45¾" O. D. A forged liner has been precision machined for an exact fit into its 25" bore.



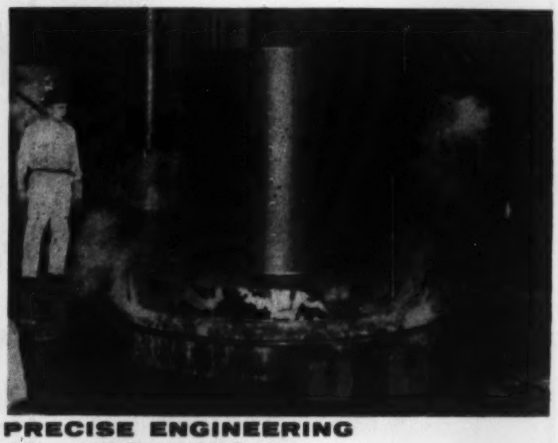
AN OUTER RING

. . . the first of five, which have been forged, machined, heat treated and inspected. All will be shrunk on the sleeve, after accurate checks have been made in position, along and around the periphery.



FIRST DOWN

. . . or at least on the way . . . with four more to go. Each ring is 76-1/16" O. D. and 13" across the face. Inspected for dimensional accuracy and machine finish . . . checked for tensile strength and hardness . . . subjected to 100% Sonic test.



PRECISE ENGINEERING AND MACHINING

. . . needed for shrink-fit, which must be tight enough to withstand operating pressures, but not tight enough to crack under any stresses set up by cooling of the ring. Each of the five rings present the same problem.

The photographs above are indicative on only a few of the extensive facilities and skills developed at Midvale during the past ninety years. The same productive know-how is utilized for forging shells, rolls, shafts, flanges, pressure vessels . . . in carbon, alloy or stainless steel . . . or in producing corrosion and heat resisting castings. Your job is not too small . . . nor too big for Midvale. Call us for a quotation on your next order.

THE MIDVALE COMPANY-Nicetown, Philadelphia 40, Pa.

Offices: New York, Chicago, Pittsburgh, Washington, Cleveland, San Francisco

MIDVALE

FORGINGS, ROLLS, RINGS, FLANGES, STAINLESS STEEL CASTINGS

STEEL
The Metalworking Weekly

DECEMBER 5, 1955
Vol. 137 No. 23

METALWORKING OUTLOOK, 75

The Editor's Views, 79

Construction: Economic Pacesetter Again in 1956, 81
Industrial expansions spark increases

Boom in Europe, 92
STEEL's annual series covers Italy and Sweden

Air Force Tools: Negotiated Programs To Stand, 83

Keyman Plan Helps Solve Hotpoint Problems, 84

Need More Working Capital? 85

Industrial Motors: Trend Line Rises, 86

Steel Strapping Wraps It Up, 87

Proposed Steel Merger May Get Quick Trial, 87

Malleable Founders Seek Record, 91

Windows of Washington, 88

Mirrors of Motordom, 95

The Business Trend, 99

Men of Industry, 103

New Products, 153

Behind the Scenes, 6

Letters to the Editors, 10

Calendar of Meetings, 25

New Literature, 167

TECHNICAL OUTLOOK, 121

Weld Inspector Sees with Sound, 122
Ultrasonics monitors tube welding quality

Lacquer Boosts Vacuum Finishing, 124
Metallizing gets a smooth base and tough cover

Tooling with a Future, 126
Machines need planning for quick change-over

Thickness Gage That Thinks, 130
It controls roll gap and tension on rolling mill

Flow Turning Bridges the Gap, 128

Salt Bath: Case for Gears, 136

Plastics Speed Jet Assembly, 139

Descaler Cleans Rods with Cut Wire, 140

Printed Circuit Industry Expands, 148

Vacuum Brazing on Trial, 150

MARKET OUTLOOK, 173

Steel Operations, 173

Price Comparisons, 174

Nonferrous Roundup, 176

Nonferrous Prices, 178

Steel Prices, begin 180

Scrap Prices, 198

Editorial & Business Staffs, 16. Advertising Index, 202.

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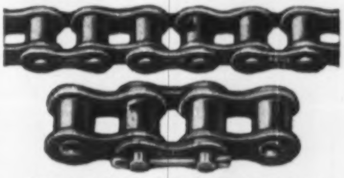
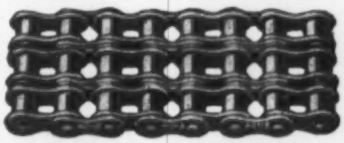
WRITE FOR THIS
FREE
TEXT

An accurate and useful 76 page compilation of chain data. A valuable textbook for engineers . . . grows to be indispensable. Free upon request to Dept. 10 X, ACME CHAIN CORP., Holyoke, Mass.

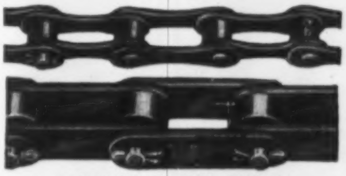
COMPLETE PRODUCTION FACILITIES AND PROMPT DELIVERY ON ALL THESE CHAINS



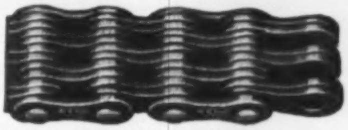
STANDARD ROLLER CHAINS
Available in pitches from 3/8" to 2½" riveted and detachable type.



STANDARD MULTIPLE WIDTH
Multiple widths of six strand or wider available for special application.



DOUBLE PITCH CHAIN
For use in slower speed power transmission and material handling conveyors.



CABLE CHAINS
Acme Cable Chains are furnished in a variety of pitches, widths and strength.

SPROCKETS
Acme Sprockets are available in a wide range of sizes, in all types.

PHONE JEfferson 2-9458.

Acme Chain Corporation
HOLYOKE MASSACHUSETTS

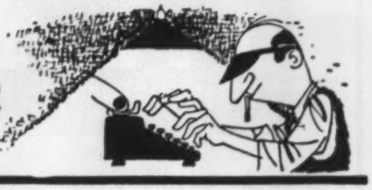
making a
MARKED
IMPROVEMENT
in PAINT CAN MARKING

NOZZLE WHITE 6/12/
MM
NO.1226B WHITE B122 6/12/55
NO.1226B WHITE B122 6/12/55

The problem of paper labels on cans becoming dirty and torn (and presenting a poor sales appearance on the retailer's shelf) plagued a typical paint manufacturer, until he began using the Markem Method. Now he's imprinting variable data (color, batch number, etc.) on 1500 lithographed cans per hour with a Markem 70AF machine. Changing imprint simply means sliding new type into the masterplate (instead of ordering 2000 new labels). Whether it's a container, product, part or tag you're marking—for decoration, designation or identification—ask Markem. Thousands have, for the past 40 years. Write Markem Machine Co., Keene 30, New Hampshire.

MARKEM ...TO MAKE YOUR MARK

behind the scenes



Building Bonanza

Construction prospects for 1956, according to the story on page 81, are mouth watering for everybody who has any stake at all in this business. This year construction is at a $42 billion rate; next year, the experts say, $44 billion will be paid out for homes, buildings, highways and the many construction projects already planned The figures make your head swim if you really try to grasp them. How much is a billion dollars, anyway? In French and American numeration, it is a mere thousand million; in German and English numeration, it is a million million. *Pravda* hasn't taken a stand one way or the other, so we may never know what a billion rubles amounts to.

The figures in STEEL's construction article will increase your respect for this front-running industry. Construction has been an industrial pace setter every year since the war, and statistics suggest that 1956 will be no exception.

We keep coming back to that $44 billion figure like a child to an open flame; figures are so crazy if you really dig them. For instance, it is said that the quantity of pi was definitely computed in the 16th century by a Hollander, name of Ludolph von Keuler. Sounds like a Japanese spy named Rudolph, doesn't it? Well, Ludolph worked at pi all his life, and finally came up with 3.141,592,653,589,793,238,462,643,383,279,502,884+. He was so excited he requested that this great discovery be engraved on his tomb, and we were so excited after counting up all those ciphers we added an epitaph:

Ludolph von Keuler
Would never say die:
He wanted to know
The meaning of pi;
So he figured and sweat
And mumbled, 'tis said,
Of ciphers and digits
That danced in his head
Till his shaky old hand
Could scarce hold the quill,
And Ludolph, himself,
Was over the hill.
"A vill-o'-de-visp,"
Said neighbor von Schimmel;
"Von Keuler iss punchy—
Und dot pi! Gott in himmel!"
But shortly before
Our genius expired
He called for a quill
And, fully inspired,
He scratched out a set
Of ciphers awry
Purporting to be
Elusive old pi!
"Now, when I am dead,"
Von Keuler he groaned,
"I want all them figures
Graved into the stone
That covers my tomb,
So folks passing by
May know these remains
Are the Pappy of pi!"

Promote Editors

Two of our associate editors have been sent forth to toil in the metalworking news pastures of New York and Washington. James P. Morrissey, who used to edit the Business Trend section in STEEL, has been appointed head of STEEL's Washington bureau. A Purdue University graduate, Jim joined STEEL as assistant editor in 1954. He was promoted to associate editor in 1955. Previously as both a serviceman and civilian, he was an electronics technician in the Air Force. In his new capacity, he will write Windows of Washington and handle general news assignments.

As soon as Associate Editor Stanley Stewart sells his house and recovers his spare suit from the cleaners, he will move to New York to join Ben Price and L. E. Browne in STEEL's eastern office. "New York doesn't scare me a bit," said Stanley, eying a map of the metropolis, "because I'll probably live in Connecticut, or Pennsylvania, or some other place within easy commuting distance."

Before joining STEEL in 1954, Stewart devoted several years doing newspaper, advertising and technical writing. He is a graduate of Western Reserve University, and had two years of engineering at Stanford University.

Shrdlu

(Metalworking Outlook—Page 75)

DOES *your* MACHINE LOAD SYSTEM STACK UP TO THESE STANDARDS?

*(Mr. Jones controls his shop... Mr. Smith's shop controls him...
How about you? Take a quick look at this check list!)*

☐ Is your machine loading system flexible?

☐ Can you give shipping dates that mean something?

☐ Do you know your machine capacity for new work—right now?

☐ Can you easily adjust your load to handle new high priority orders?

☐ Can you tell quickly what jobs constitute the load on each machine or work center?

☐ Are you providing for downtime in your schedule?

☐ Are you performing in accordance with your preplanned schedule?

☐ Are you gaining customers through ability to meet your schedules?

☐ Can you notify customers promptly of schedule changes?

if **YOU'RE NOT GETTING THESE RESULTS,** then you may be interested in changing to a system that stacks up to these standards. Such a system is Sched-U-Graph – a visual chart-board method of control. It's economical. It's accurate. It cuts time-consuming calculations to a minimum and eliminates guesswork entirely.

Find out more about Sched-U-Graph today! See for yourself how it can save time and build profits in your plant. Get illustrated folder KD738—"An Effective Machine Loading System." Write Room 2242, 315 Fourth Avenue, New York 10.

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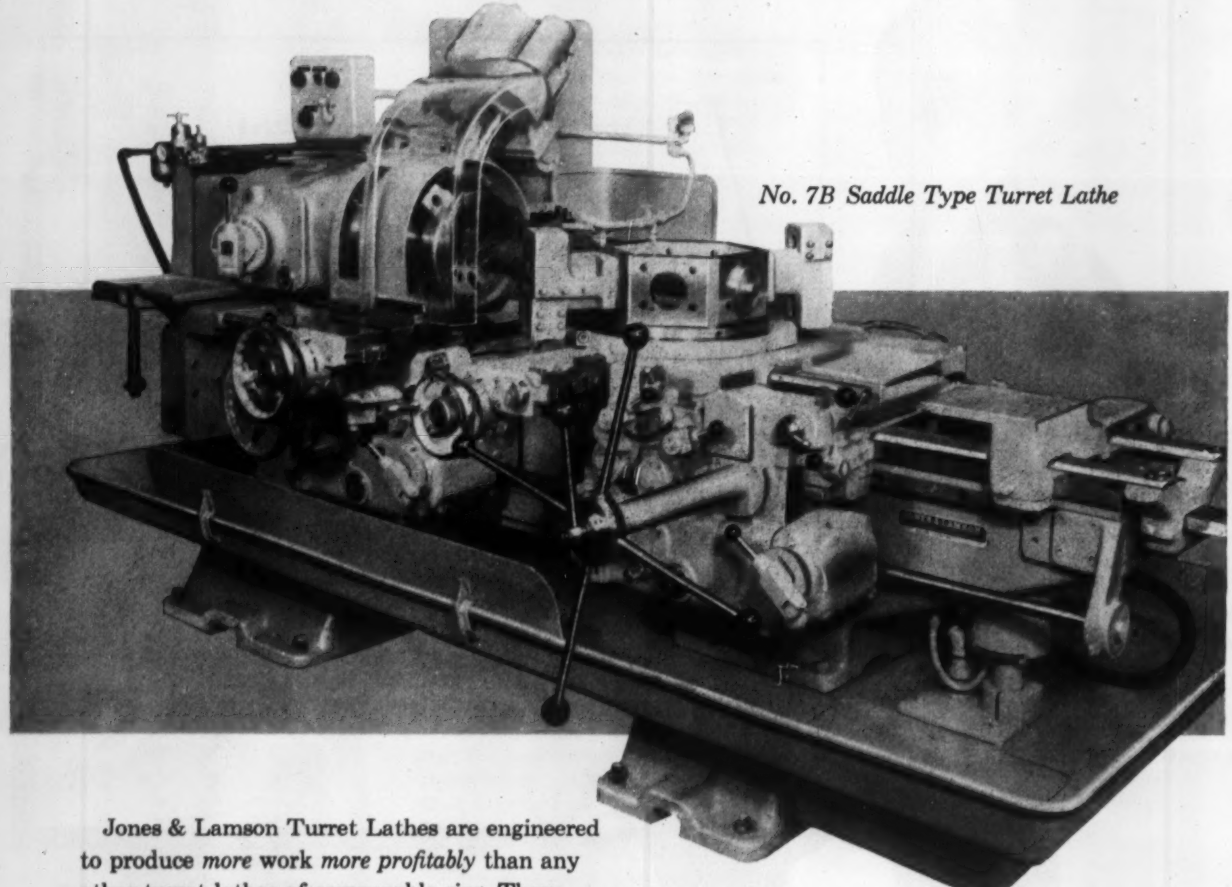
DIVISION OF SPERRY RAND CORPORATION

Engineered for Precision... Powered for Production...



No. 7B Saddle Type Turret Lathe

Jones & Lamson Turret Lathes are engineered to produce *more* work *more profitably* than any other turret lathes of comparable size. They have the rugged, rigid construction that makes possible greater accuracy and the use of Hi-Velocity turning; and they incorporate many superior features that assure PRODUCTIVE CAPACITY unmatched in its class. Adequate spindle speeds and horsepower insure the proper use of carbide cutting tools at surface speeds of 650-750 feet per minute.

J&L® JONES & LAMSON MACHINE COMPANY

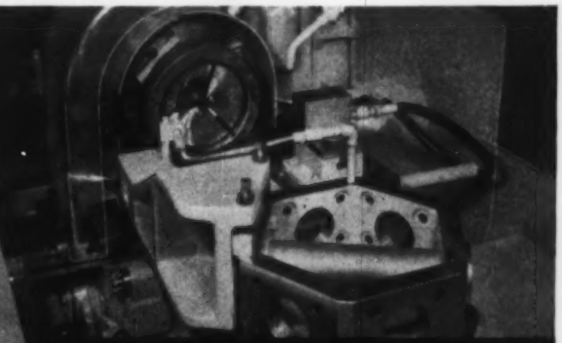
Jones & Lamson offers you a choice of methods for acquiring modern, profit-producing J & L equipment. In addition to outright purchase, J & L makes available several different "Pay-From-Productivity" plans at interest rates of 3¼% and lower (add-on), and a broad variety of lease plans.

Send today for complete details on J & L's machines, methods and Procurement Plans. Simply fill in the coupon, clip it to your letterhead and mail.

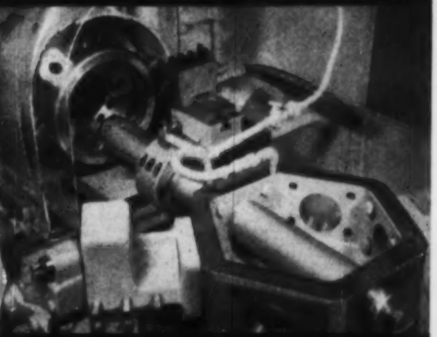
and capable of doing jobs like this...

Machine tools do not pay dividends unless they are cutting metal. Engineering the tooling around the parts to be produced reduces the setup time to a minimum, and in many cases doubles the production per labor hour.

In this case high production methods of tooling for automatic lathes were simplified and applied to three 7B J&L Universal Saddle Type Turret Lathes. Inner and Outer Ball Bearing Races and Roller Bearing Races are produced on the same machines. Setup time from one lot to the next does not exceed fifteen to twenty minutes per machine.



First Operation: One tool mounted on the Hex Turret turns the O.D. while a tool mounted on the rear of the cross slide faces one end. At the end of the facing cut, the radius on the O.D. is formed. Floor-to-floor, 1.94 min.



Second Operation: Location is taken from the two previous finished surfaces. Boring and I.D. chamfering are performed by using tools mounted on the Hex Turret while facing and forming of the O.D. are finished by tools mounted on the rear of the cross slide. Floor-to-floor, 2.57 min.

Third Operation: Special wrap-around jaws mounted on a power operated three-jaw scroll chuck are used for holding the finish turned ring when grooving. The groove is formed by a radius tool held in a bar mounted on the Hex Turret (this applies to internal or external straight or taper races). I.D. is also chamfered in this operation. Floor-to-floor, 1.67 min.

MACHINE TOOL DIVISION

UNIVERSAL TURRET LATHES • FAY AUTOMATIC LATHES • AUTOMATIC DOUBLE-END MILLING & CENTERING MACHINES • AUTOMATIC THREAD & FORM GRINDERS • OPTICAL COMPARATORS AUTOMATIC OPENING THREADING DIES & CHASERS

517 Clinton St., Dept. 710, Springfield, Vt., U.S.A.

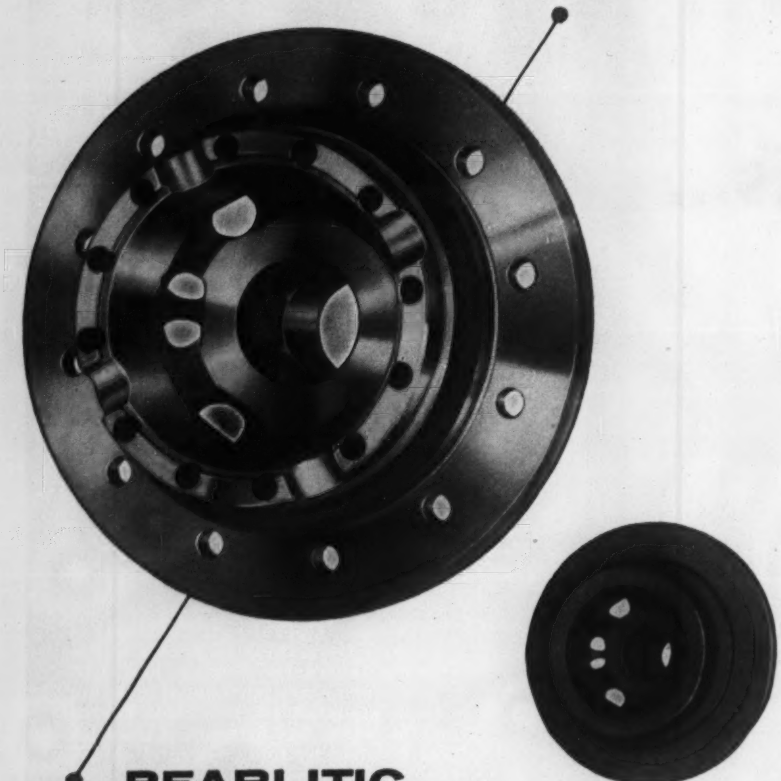
Jones & Lamson Machine Company
517 Clinton St., Dept. 710, Springfield, Vt., U. S. A.

Please send me the J & L Machine Tool Replacement Information Kit.

Name ____________________

Title ____________________

MACHINABILITY INDEX 80-90*



PEARLITIC MALLEABLE CASTINGS

*B1112 STEEL = 100

Low machinability index of 80-90 (B1112 steel = 100) is probably reason enough to warrant serious consideration for your product.

But pearlitic malleable castings—from National—don't stop there. They have great ultimate strength . . . resist wear under heavy loads at high speeds . . . make excellent non-seizing bearings . . . can be air or liquid-quenched . . . can be smooth-finished.

Don't overlook the advantages of pearlitic malleable. For pearlitic malleable castings—from National—can often reduce manufacturing costs, weight and assembly time . . . can increase the sales potential of your product. AA-1806

NATIONAL MALLEABLE AND STEEL CASTINGS COMPANY

Cleveland 6, Ohio

The Nation's largest independent producer of malleable and pearlitic malleable

LETTERS
TO THE EDITORS

Fuel Industry Analyzed

You have done a workmanlike job of analyzing the current primary fuels industry in your story, "Primary Fuels Get Set" (Nov. 14, page 73).

G. Don Sullivan
Administrative Assistant
National Coal Association
Washington

Groundwork Is Important

Please forward three copies of the tenth article in the 1955 Program for Management, "Keep Your Product Growing" (Nov. 14, page 101). I believe the article will be of value in keeping our organization alert and our product growing.

Jack Clayton
Vice President-Mfg.
Otto Bernz Co. Inc.
Rochester, N. Y.

Your article is excellent! I would appreciate six copies so that our key men will have a chance to study it in detail.

Please keep that type of excellent article appearing in your magazine. They are certainly worth-while.

E. J. Abendschein
Chisholm-Ryder Co. of Pennsylvania
Hanover, Pa.

Please send three copies of this story.

It is another one of the series that we find extremely interesting. The entire series has been constructive, and your editors are to be congratulated on the publication of such timely articles. If you plan publication of this series in one volume, we would be pleased to order several.

E. H. Rhodes
Executive Vice President
M. H. Rhodes Inc.
Hartford, Conn.

• *At this time we do not plan to publish it in one volume.*

Information on Wildcats

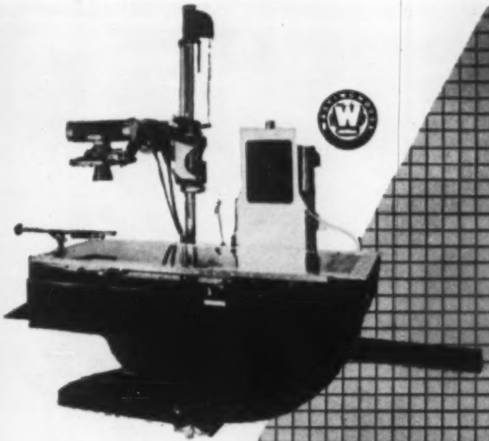
I am interested in your story, "How To Tame Wildcats" (Oct. 3, page 37). It contained a lot of useful information and was well written. Please send two copies.

William J. Kern
Sayre Apts.
Bethlehem, Pa.

Firm Reviews Auto Cost

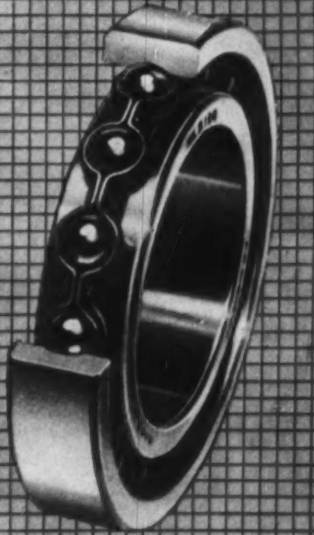
The article, "Are You Paying Too Much for Auto Expense?" (Oct. 11, 1954, page 67), has been referred to this department, and reviewed with some interest. We note that a second story,

(Please turn to page 12)



to save a life

X-ray tables require a precision all their own, for smooth, easy positioning. And, if you were to X-ray this Westinghouse Duoflex motor-driven table, you would see Federal Ball Bearings quietly at work here, too.



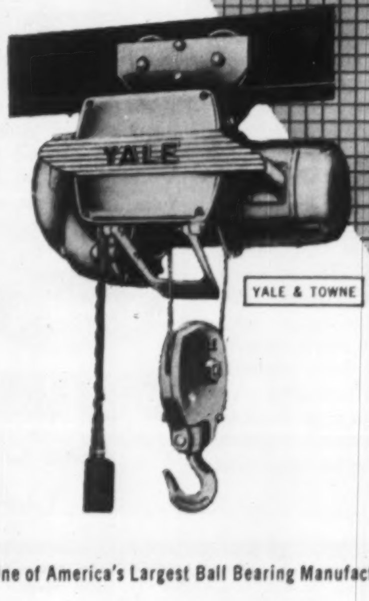
so much of industry *turns* on FEDERAL ball bearings

X-rays or escalators—hum of motors or heft of hoists—in the clinic or machine shop—Federal Ball Bearings do their quiet, anti-friction job. In your office, plant or home, you'll probably find some of the hundreds of types and 12,000 sizes produced by this 50-year-old manufacturer of ball bearings exclusively.

When Federal Ball Bearings are a part of so many things you *use*, shouldn't they be a part of the things you *make*?

175 pages, chock full of data about ball bearings are yours for the asking in FEDERAL's new catalog. Just drop us a line for your copy.

THE FEDERAL BEARINGS CO., INC. • POUGHKEEPSIE, N. Y.



or lift a safe

Husky electric hoists—capable of lifting and conveying up to 15 ton loads put a strain on bearings, too. In these mechanical "strong men", too, you'll find Federal Ball Bearings.

Federal **BALL BEARINGS** One of America's Largest Ball Bearing Manufacturers

Part of 18 barbed-wire machines at Mid-States Steel & Wire Co., all equipped with Twin Disc 8.4 HYDRO-SHEAVE Drives mounted on 3 hp 1750 rpm motors. Twin Disc Fluid Drives are available in 10 different models, for any input, output combination, with sizes from 7.45 to 27 for ¾ to 850 hp. Request Bulletin 144-D.

Stops breaks and spares the horses

With mechanical drive on 18 barbed-wire machines, Mid-States Steel & Wire Co. of Crawfordsville, Ind., had frequent wire breakage demanding constant operator attention. And with an extremely high starting load, a 5 horsepower motor was required for each machine.

To cure the problem, Mid-States called in their Authorized Twin Disc Hydraulic Dealer. The installation was analyzed, and Twin Disc Model 8.4 HYDRO-SHEAVE® Drives were recommended. Through these compact, self-contained fluid drives, Mid-States eliminated mechanical drive.

Immediate benefits were realized through reduction of motor size to 3 hp, selected for *running* requirements rather than starting requirements. Excessive wire breakage was stopped, for the fluid drives permit quick, smooth, motor acceleration while they pick up the load . . . without shock-loads or vibrations.

You, too, can "stop breaks and spare the horses" on powered equipment . . . by contacting your Twin Disc Authorized Hydraulic Dealer. *Write today to Twin Disc Clutch Company, Dept. DS, Racine, Wis., for full information.*

TWIN DISC

TWIN DISC
Fluid Couplings

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION Rockford Illinois

Branches or Sales Engineering Offices: Cleveland • Dallas • Detroit • Los Angeles • Newark • New Orleans • Seattle • Tulsa

LETTERS

(Concluded from page 10)

"Are You Getting the Most Out of Your Fleet Operation?" (Oct. 18, page 60) was to be printed.

We fully appreciate the time that has elapsed, but the subject has recently become of interest in our company. If available, we would like reprints.

M. C. Singley Jr.
Auditor
Harrington & Richardson Inc.
Worcester, Mass.

Selector Aids Engineers

I would appreciate ten copies of the Metal Selector (insert in the Oct. 10 issue). They would be of invaluable assistance to the drafting section of our engineering department.

Harry Schutz
Engineering Dept.
Wheel & Brake Plant
Tire & Equipment Division
B. F. Goodrich Co.
Troy, O.

We feel this is a worth-while piece of information. We would like copies for each of our ten salesmen.

H. L. Eckl
District Service Manager
Kaiser Aluminum & Chemical Sales Inc.
Milwaukee 3, Wis.

Ceramic Cutting Tool?

We have read with interest the Machine Topics column of Oct. 31 (page 74). Do you have any more information on ceramic cutting tools?

Ernest J. Svenson
President
John S. Barnes Corp.
Rockford, Ill.

• *The column summarized most of the information we have. For further data, contact Carboloy Dept., General Electric Co., P. O. Box 237, Roosevelt Park Annex, Detroit 32, Mich. or Norton Co., 50 New Bond St., Worcester 6, Mass.*

Powdered Lubricant

In the Technical Outlook column of a recent edition of STEEL (July 11, page 87), I read of a powdered lubricant developed by Glyco Products Inc. Where may I get additional information about this product?

K. G. Willoughby Jr.
Chief Chemist
Morse Chain Co.
Ithaca, N. Y.

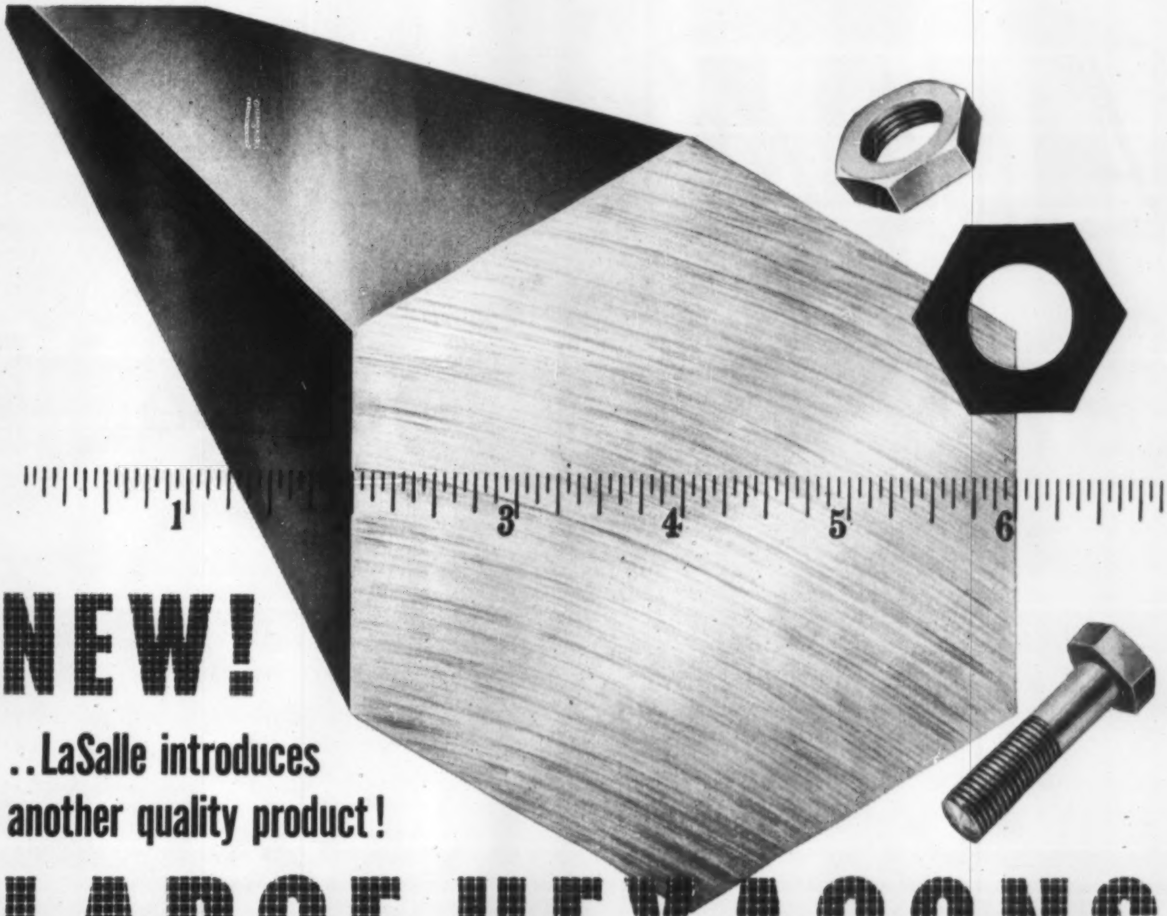
• *Write the company at: Empire State Bldg., New York 1, N. Y.*

Story Assists Executives

May I have a copy of the metalworking map illustrated in the article, "Market Facts: Where You Find Them and How To Use Them" (Oct. 24, page 91)?

The article is an interesting one and would be of great assistance to anyone in a management position.

H. F. Krohn
District Sales Office
Bethlehem Steel Co.
Chicago



NEW!

..LaSalle introduces another quality product!

LARGE HEXAGONS

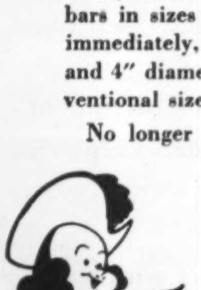
available NOW! .. in cold-drawn steel bars (GRADE C 1018) .. sizes to 4″

Yes, you can now buy cold-drawn hexagon steel bars in sizes up to and including 4″. Effective immediately, LaSalle offers 3¼″, 3½″, 3¾″ and 4″ diameter hexagons .. in addition to conventional sizes ranging from ⅛″ to 3″.

No longer is it necessary to resort to costly and time-consuming forging, milling or other machining to produce large-size hexagons.

And with *cold-drawn* large hexagons you naturally get the superior mechanical qualities inherent in cold-drawn steel bars. Ask your steel distributor for Large Hexagons by LaSalle.

For additional detailed information, send for your copy of this helpful new data sheet, "Large Hexagons."



La Salle STEEL CO.

the Most Complete Line of Carbon and Alloy Cold-Finished and Ground and Polished Steel Bars in America.

LA SALLE STEEL COMPANY
1414 150th Street
Hammond, Indiana

Please send me Helpful Data Bulletin No. 14 "Large Hexagons"

Name ________________

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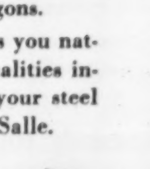
Company ________________

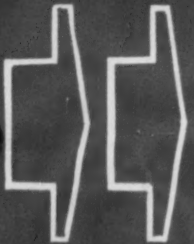
Address ________________

City ________ Zone ____ State ________



AJAX *announces*

New 3-Degree DIHEDRAL COUPLINGS



THE FIRST TRULY

New Ajax 3-D Dihedral Couplings handle up to 3 degrees of misalignment. They are priced at the same level as ordinary gear type couplings!

These new Ajax 3-D Dihedral Couplings now make it possible for design engineers to take advantage of Dihedral performance at low first cost. Precision assembly tolerances can often be relaxed, with savings at the factory and in the field.

The exclusive Ajax Dihedral principle has been proved and approved under the most severe operating conditions.

Features of the new Ajax 3-D Dihedral Coupling include:

3 degree misalignment capacity.

Load is distributed at center of teeth at the point of greatest strength.

More tooth strength is provided under misalignment than is possible with any other tooth shape.

Exclusive Ajax Dihedral tooth design has less clearance than conventional gear type couplings.

No end-of-tooth wear under misalignment.

Johns-Manville "Clipper" seals keep lubricant in and foreign matter out.

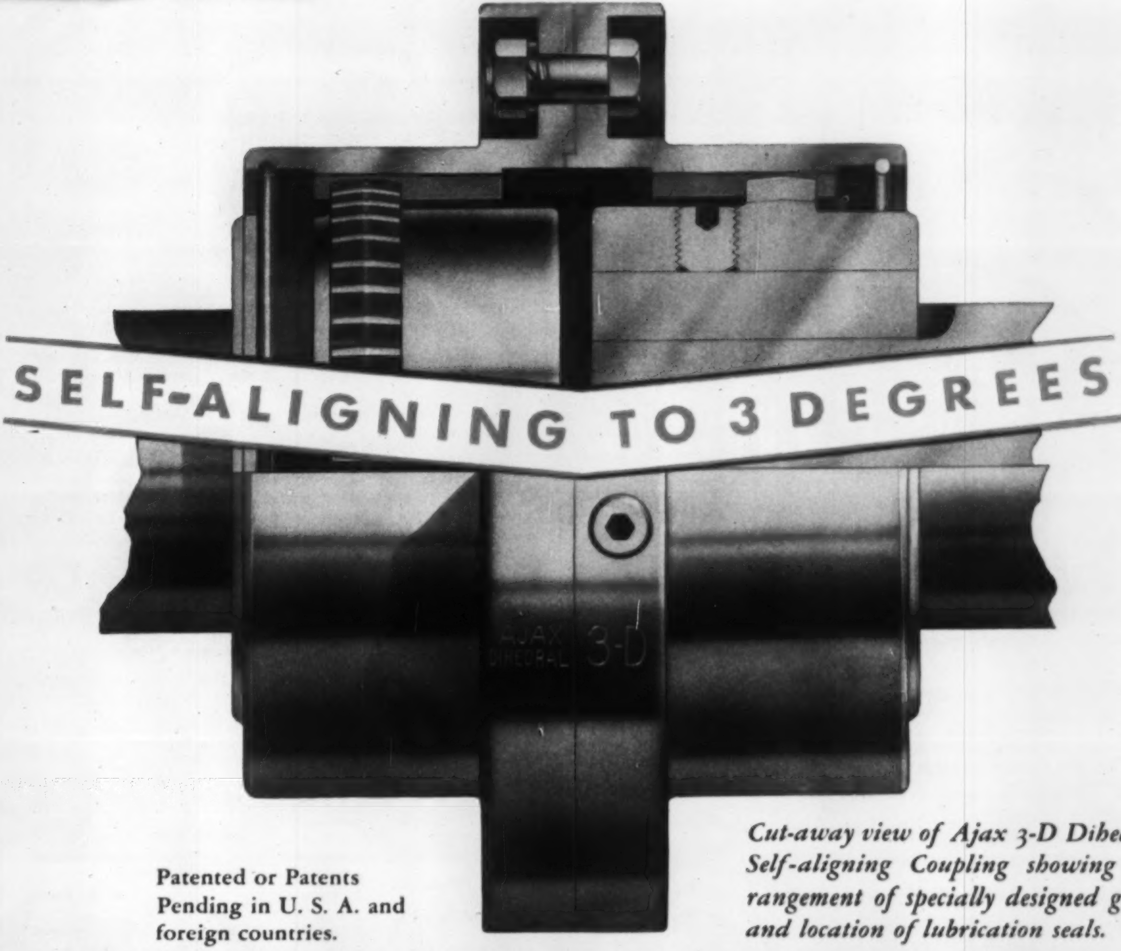
Compact overall size.

Designed for NEMA motors with standard keys.

Low prices competitive with ordinary gear type couplings.

Available in 5 sizes.

Write for new Catalog No. 60.


SELF-ALIGNING TO 3 DEGREES
AJAX DIHEDRAL
3-D

Patented or Patents
Pending in U. S. A. and
foreign countries.

Cut-away view of Ajax 3-D Dihedral Self-aligning Coupling showing arrangement of specially designed gears and location of lubrication seals.

SELF-ALIGNING COUPLING

AT ORDINARY GEAR TYPE PRICES!!

AJAX FLEXIBLE COUPLING CO. INC.

REPRESENTATIVES IN PRINCIPAL CITIES

WESTFIELD, N. Y.

THE WORLD'S MOST COMPLETE LINE OF FLEXIBLE COUPLINGS

TURKEY . . .
AND TUBING!

■ There is no "holiday season" at TMI. Around the calendar, we're meeting and beating rigid specifications for straightness, finish, close tolerance and special shaping in cold drawn stainless and alloy tubing that "talks turkey" in no uncertain terms. We've carved ourselves a position of respect and responsibility.

■ Who "sits around the table" to share TMI tubing? Design and experimental engineers, production superintendents, purchasing agents . . . and management.

■ It's our job, and the job of every foot of TMI tubing, to make *their* products better and to protect *their* profit position. Our recipe for your confidence: TMI's tools, men and experience, seasoned with a reputation for cooperation. May we serve you?

Specify TMI
SMALL DIAMETER
.050 TO .625 O.D.
COLD DRAWN
STAINLESS STEEL
AND SPECIAL ALLOY
Tubing

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NBP

. . . are you PROUD of your KITCHEN SINK?

SOUTHERN PORCELAIN is proud of theirs . . .

Down in Dallas (Texas, where they make them, that is) they're *real proud*, Pardner! It's the combination of greater sales appeal and lower production costs that's pleasing them so!

Southern Porcelain's mighty pleased with Sciaky resistance welding, too! That's what improved their methods and cut their costs and increased their product sales appeal!

Are you proud of *your* "kitchen sink"? You can be . . . because, the chances are, you can simplify *your* production methods and lower *your* production costs with Sciaky resistance welding —just like Southern Porcelain did!

SCIAKY®

Largest Manufacturers of Electric Resistance Welding Machines in the World

GO AHEAD *turn the page and see the facts on Southern Porcelain's resistance welding operation . . .*

High production Sciaky resistance welding joins

TEN THOUSAND UNITS WITH LESS THAN 1% SCRAP FACTOR

Other methods of fabricating Double-Sinks FAIL!

How ~~old~~ is "antique"? ...with resistance welders it may be only five years because of recent Sciaky technical achievement.

Production limitations and high operating cost make these antiques "expensive." You can't be competitive if your product won't let you compete!

Within ten days of delivery, one Sciaky mash welder with an inexperienced operator joined 10,000 sink units with less than 1% scrap factor for Southern Porcelain in Dallas, Texas. Not only quality and production beyond expectation, but metal finishing operations were minimized.

For almost a year Southern Porcelain unsuccessfully tried every conceivable method to join two 14 gauge Armco deep drawn steel sink units to fabricate a double-sink. Reject rates ran high because porcelain finishing demanded a strong, smooth, non-porous joint.

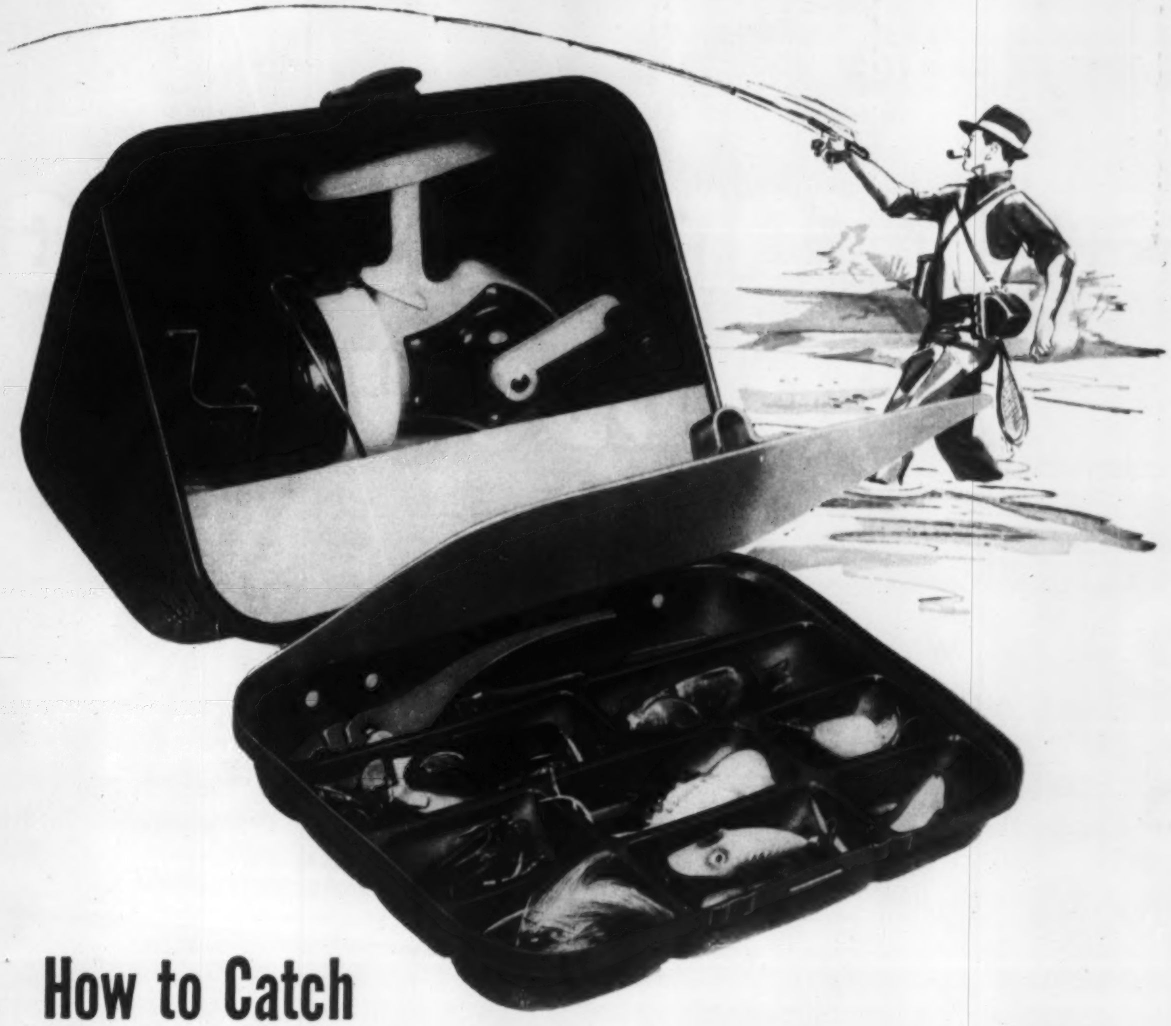
The relatively simple solution to this problem is actually the product of Sciaky's basic philosophy in design—resistance welding to do *more useful work* at *lowest operating cost* with *maximum reliability*.

You can read all the details of this interesting application *free*—send your name and title on company letterhead for your copy of "Resistance Welding At Work", Vol. 4—#6.

Largest Manufacturers of Electric Resistance Welding Machines in the World

SCIAKY®

Sciaky Bros., Inc., 4910 West 67th Street, Chicago 38, Ill., Portsmouth 7-5600



How to Catch a Fisherman

It's said that fishermen buy more things than fish do. Be that as it may, the spinning tackle box by UMCO Corporation of Minneapolis, made of tough, versatile U. S. Royalite, illustrates some of the many advantages of this fine fabricating material. For Royalite is:

1 **Impact Resistant.** Tackle boxes are often banged against rocks or dropped into boats. Royalite can "take it".

2 **Rustproof.** Salt water or fresh, Royalite is completely unaffected. These spinning tackle boxes are often used by skin divers to carry equipment.

3 **Easily Fabricated.** Note molded-in lure compartments and sharp detail. Low-cost wood, resin or metal tools do the job, depending on volume.

4 **Compatible with Metal.** Note the aluminum plate, hinged to the Royalite. The latch fastens to the Royalite. The hinges, handles and buckles are riveted permanently in place.

Royalite is also: . . . *impervious* to most chemicals . . . *lighter in weight* than any commonly used metal . . . *beautiful*, in a wide range of colors and finishes . . . compounded of *plastic* fortified with *rubber* for superior impact resistance.

Want to catch more customers? Design it of Royalite for greater beauty-appeal, better service, much stronger saleability. Write, wire or phone for details to United States Rubber Company, 2638 N. Pulaski Road, Chicago 39, Illinois.

U.S. ROYALITE®
TOUGH, VERSATILE FABRICATING MATERIAL

United States Rubber

SELF-COMPENSATING HOLDDOWN

NIAGARA
Nº810
NIAGARA

America's Most Complete Line of Presses, Shears, Machines and Tools for Plate and Sheet Metal Work

a BIG FACTOR in the superiority of Niagara Shears

No 810
T1/4 MILD STEEL

"STRAIGHT-EDGE" CUTTING ACCURACY
Positive, power actuation grips work securely for maximum cutting accuracy.

LOW IMPACT AVERTS DAMAGE AND INACCURACY
Individual pressure feet contact work with low impact, thus safeguarding both the material and bed against damage, as well as reducing noise level. No hammer-blows to mar work. No peening of bed with resulting distortion of knife seat.

SIMPLIFIED, LOW UPKEEP DESIGN
Simplicity of design and construction, involving a minimum number of parts, assures negligible servicing. With *less* to go wrong, there is *less* to repair and replace.

HOLDS WORK FLAT AND STATIONARY
Multiple pressure feet on 6″ centers, applying uniform pressure, hold work flat and tight against bed to assure utmost shearing accuracy. No rippling of sheet between feet as cut progresses. Firm grip on short pieces.

HANDLES STOCK OF VARYING THICKNESS
Individual feet are self-compensating, requiring no adjustment for cutting stock of different thicknesses . . . *even at the same time.*

NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.

DISTRICT OFFICES: Detroit • Cleveland • New York • Philadelphia

Dealers in principal U. S. cities and major foreign countries

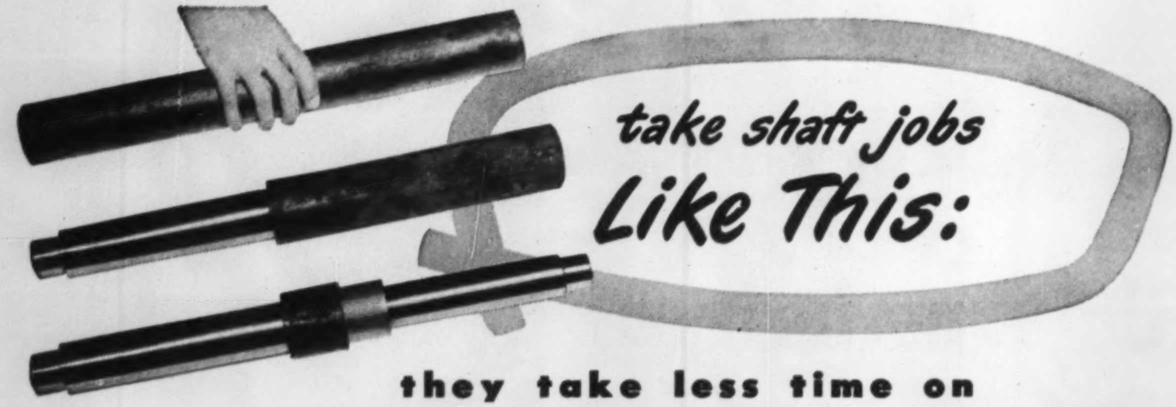
In a power squaring shear, no *single* feature nor component can be fully responsible for accuracy, speed and economy. *They* result from a *combination* of features such as the self-compensating holddown; rigid, fully closed box section construction of bed and crosshead; low slope of upper knife; ample and accurately held crosshead guides; multiple point sleeve clutch — the very features that have established the marked superiority of Niagara's Underdrive Series.

For the whole story, straightforwardly presented, on America's most complete line of underdrive power squaring shears, with capacities from shim stock to 1 in. thick mild steel (lengths 3 to 20 ft.), request *Niagara Bulletin 69.* Write today.

NIAGARA
POWER SQUARING SHEARS

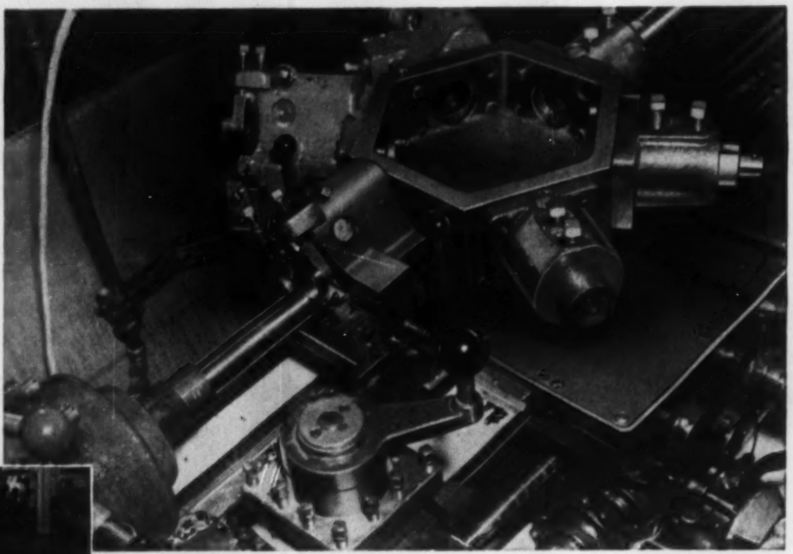
NIAGARA

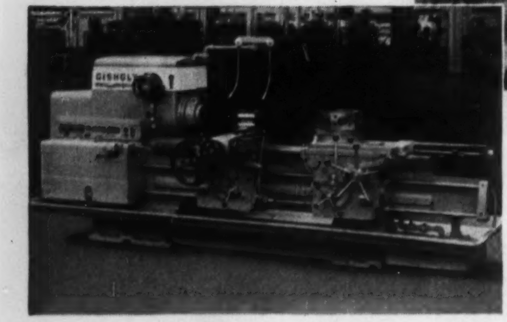
UNDERDRIVE SQUARING SHEARS



they take less time on
GISHOLT TURRET LATHES

Yes, even in lots as small as 5 or 10 parts, you can't beat turret lathes on this kind of work. Parts are machined complete in 2 operations—total time is less than 4 min.





no extra equipment needed!

With no more than your standard bar equipment, you're all set to cut machining costs on shafts like these. No previous operations . . . such as cutting to length or centering . . . are necessary. And with *two or more tools* from turret and side carriage, you have the basic advantage of turret lathe economy—the time saving that means lower costs.

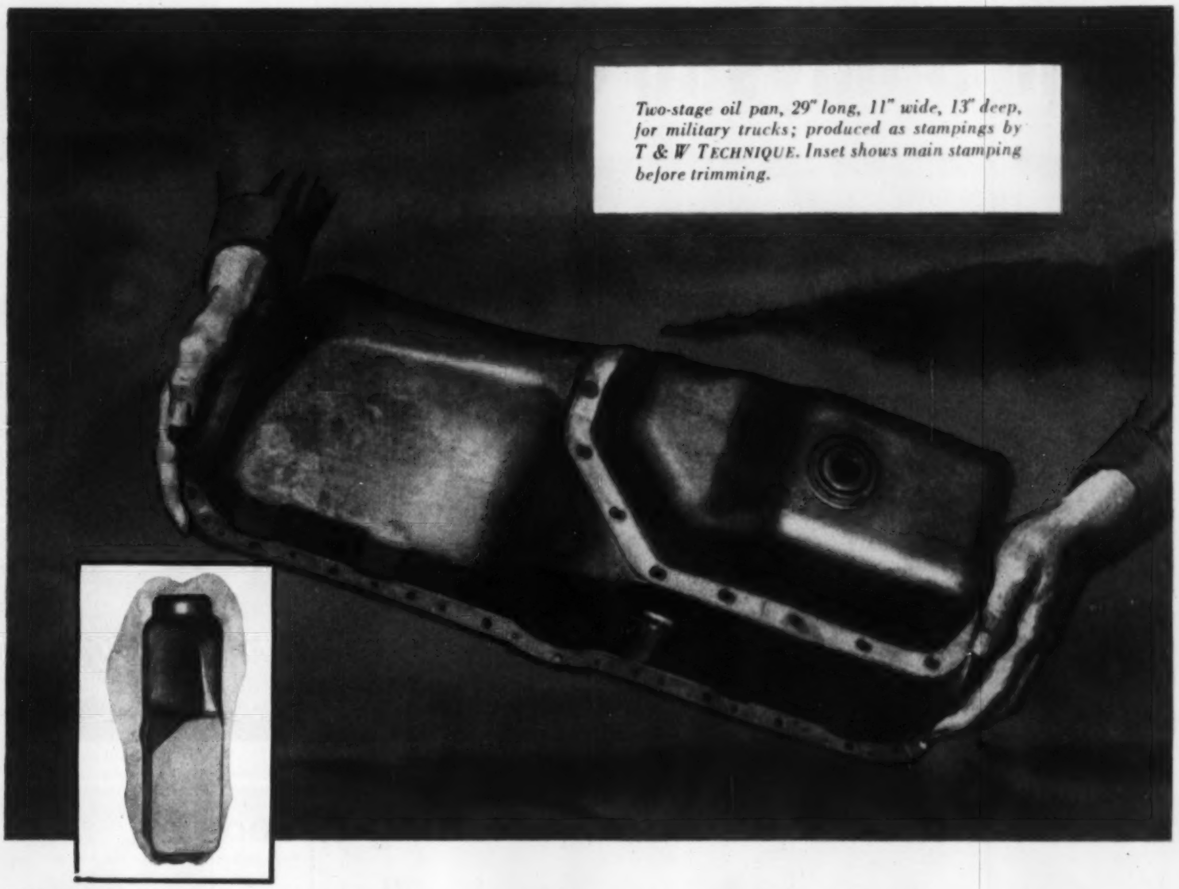
Before you turn to extra equipment or special attachments, look into the possibilities of doing the job the quick and easy way on Gisholt Turret Lathes. Gisholt engineers will gladly help you.

THE GISHOLT ROUND TABLE *represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.*

GISHOLT

GISHOLT MACHINE COMPANY
MADISON 10, WISCONSIN

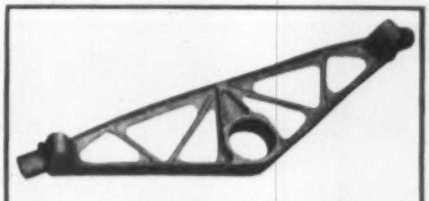
TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES



Two-stage oil pan, 29" long, 11" wide, 13" deep, for military trucks; produced as stampings by T & W TECHNIQUE. Inset shows main stamping before trimming.

T&W TECHNIQUE can save production dollars for you

● If you buy stampings or forgings, then you want to know all about T & W Technique. Benefits from T & W Technique come to you in many ways — in effective design and engineering service, in extra skill which completes hard-to-produce parts without delay, in quality control, in delivery on schedule. But, always, forgings and stampings from T & W are likely to meet your needs so well that they cost you less at the point of assembly.



T & W Technique provides you with forgings like this fulcrum, as well as stampings, which meet your needs better, help you save production dollars.

STAMPINGS
T&W
FORGINGS

TRANSUE & WILLIAMS
Over 50 years of experience

Sales Offices:

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TO: Transue and Williams, Alliance, Ohio
Please let me know what "T & W Technique" can do for us. We are interested in
☐ Forgings ☐ Stampings
Name
Company
Street
City Zone State
1303

T & W DEEP DRAWN STAMPINGS AND FORGINGS USUALLY COST LESS AT THE POINT OF ASSEMBLY

From 5 days to only 4 hours...

Powder-lancing is the fastest method for piercing steel and many other materials.

Using a powder-lance, it took one man only 12 hours to make a 3 ft. diameter hole in this 2 ft. thick slag pit wall.

Powder-lancing speeds steel mill operations

Once it took 2 men 5 days to chip away four 10 in. diameter risers on ingot molds like the one shown here—but these four risers were removed in only 4 hrs. using a powder-lance. . . . The removal of 6 in. diameter risers from another mold was speeded from 3 days to only 30 minutes.

In still another operation, a 3 ft. diameter hole was cut through the 2 ft. thick concrete wall of a blast furnace slag pit in only 12 hours. Cost savings were more than 50 per cent over previous methods.

Powder-lancing is the fastest method for piercing holes in concrete, cinder block, fire brick, blast furnace refractories, steel and cast iron containing inclusions, and sand and metal incrustations.

Cut costs, and speed production and maintenance in your mill . . . Call your local LINDE representative for more information on efficient, high speed powder-lancing. Start saving now, call him today.

Linde Air Products Company
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
Offices in Other Principal Cities
In Canada: LINDE AIR PRODUCTS COMPANY
Division of Union Carbide Canada Limited, Toronto
(formerly Dominion Oxygen Company)

Linde
Trade-Mark

The term "Linde" is a registered trade-mark of Union Carbide and Carbon Corporation.

CALENDAR
OF MEETINGS

Dec. 5-9, National Exposition of Chemical Industries: Commercial Museum and Convention Hall, Philadelphia. Information: International Exposition Co., 480 Lexington Ave., New York 17, N. Y. Manager: E. K. Stevens.

Dec. 7-9, American Institute of Mining & Metallurgical Engineers: Electric furnace steel conference, William Penn hotel, Pittsburgh. Institute's address: 29 W. 39th St., New York, N. Y. Secretary: E. H. Robie.

Dec. 7-9, National Association of Manufacturers: Annual meeting and exhibit, Waldorf Astoria, New York. Association's address: 2 E. 48th St., New York, N. Y. Secretary: Noel Sargent.

Dec. 12-13, Material Handling Institute Inc.: Annual meeting, Hotel Statler, New York. Institute's address: One Gateway Center, Pittsburgh 22, Pa. Managing director: R. Kennedy Hanson.

Dec. 12-16, Atomic Exposition and Nuclear Engineering & Science Congress: Public Auditorium, Cleveland. Information; International Atomic Exposition, 931 Book Bldg., Detroit 26, Mich.

Dec. 13-15, Industrial Truck Association: Winter meeting, Hotel Statler, New York. Association's address: Washington Loan & Trust Bldg., Washington 4, D. C. Managing director: William Van C. Brandt.

Jan. 3-6, Institute of Scrap Iron & Steel Inc.: Annual meeting and exhibit, Sherman hotel, Chicago. Institute's address: 1729 H St. N. W., Washington 6, D. C. Executive vice president: E. C. Barringer.

Jan. 9-13, Society of Automotive Engineers Inc.: Annual meeting, Sheraton-Cadillac hotel and Hotel Statler, Detroit. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.

Jan. 11-13, Aluminum Extruders Council: Annual meeting, Saxony hotel, Miami Beach, Fla. Council's address: 209 Washington St., Boston, Mass. Executive secretary: Phillip Lemelman.

Jan. 11-14, American Road Builders' Association: Annual convention and exhibit, Municipal Auditorium, Miami Beach, Fla. Association's address: World Center Bldg., Washington 6. D. C. Executive vice president and secretary: Eugene Reybold.

Jan. 18-19, Caster & Floor Truck Manufacturers Association: Annual meeting, New Weston hotel, New York. Association's address: 27 E. Monroe St., Chicago 3, Ill. Secretary: Harry P. Dolan.

Jan. 18-19, Steel Shipping Containers Institute Inc.: Winter meeting, Hampshire House, New York. Institute's address: 600 Fifth Ave., New York 20, N. Y. Secretary: L. B. Miller.

Jan. 19-20, Steel Plate Fabricators Association: Annual meeting, Palmer House, Chicago. Association's address: 79 W. Monroe St., Chicago 3, Ill. Secretary: J. Dwight Evans.

Jan. 20, Malleable Founders' Society: Semiannual meeting, Hotel Cleveland, Cleveland. Society's address: 1800 Union Commerce Bldg., Cleveland 15, O. Secretary: Lowell D. Ryan.

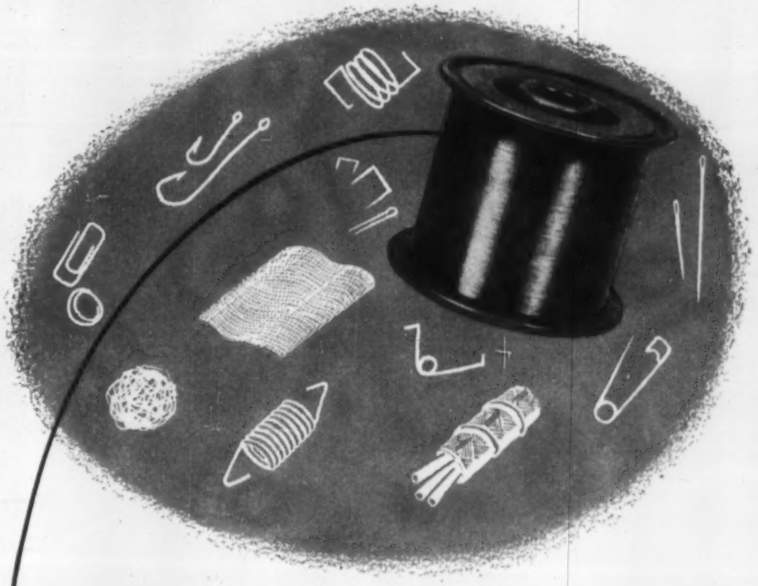
Jan. 23-24, Industrial Heating Equipment Association: Annual meeting, LaSalle hotel, Chicago. Association's address: Associations Bldg., Washington 6, D. C. Executive vice president: Carl L. Ipsen.

Jan. 23-25, Truck-Trailer Manufacturers Association Inc.: Annual meeting, Edgewater Gulf hotel, Edgewater Park, Miss. Association's address: 710 Albee Bldg., Washington 5, D. C. Managing director: John B. Hulse.

Jan. 23-26, Plant Maintenance & Engineering Show: Convention Hall, Philadelphia. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

Jan. 24, Cutting Tool Manufacturers Association: Annual meeting, Detroit Yacht Club, Detroit. Association's address: 416 Penobscot Bldg., Detroit 26, Mich. Executive secretary: Martin J. Ewald.

FOR FINE WIRE PRODUCTS . . .



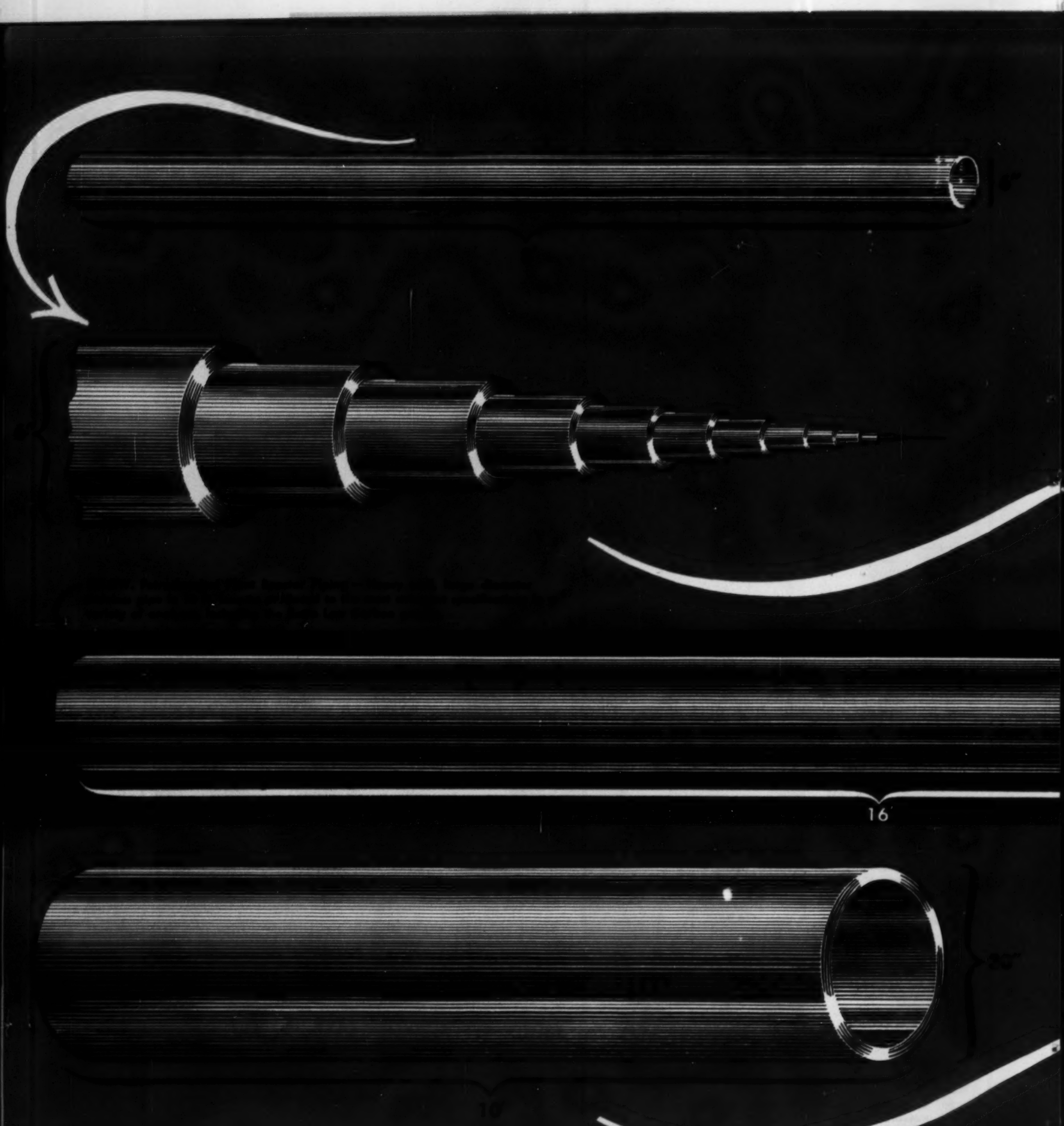
Almet Stainless Steels
MEET MORE REQUIREMENTS
THAN OTHER ENGINEERING MATERIALS

Does your Fine Wire application call for resistance to heat? . . . to corrosion? Does it require good fatigue properties . . . excellent weaving or other forming characteristics? There's a good chance you will find the material you need among the more than 20 grades of stainless steel we fabricate into high quality Fine Wire. No other family of metals has the combination of properties common to the stainless steels.

Learn more about the interesting properties and applications of our stainless steel Fine Wire, as well as our stainless Rod and Strip . . . send today for a copy of our new 40 page Stainless Steel Design Handbook.

DESIGN HANDBOOK of Stainless Steel
WIRE
ROD
STRIP

ALLOY METAL WIRE DIVISION
HKP
H. K. PORTER COMPANY, INC.
Prospect Park, Pennsylvania



UNITED STATES PIPE & FOUNDRY CO.

Special Products Division

BURLINGTON, NEW JERSEY

SPECIAL PRODUCTS DIVISION U S P

SALES OFFICES: LOS ANGELES, SAN FRANCISCO, CHICAGO, ST. LOUIS, CLEVELAND, DETROIT, PITTSBURGH, HARTFORD, BURLINGTON

3 PROBLEMS

each different

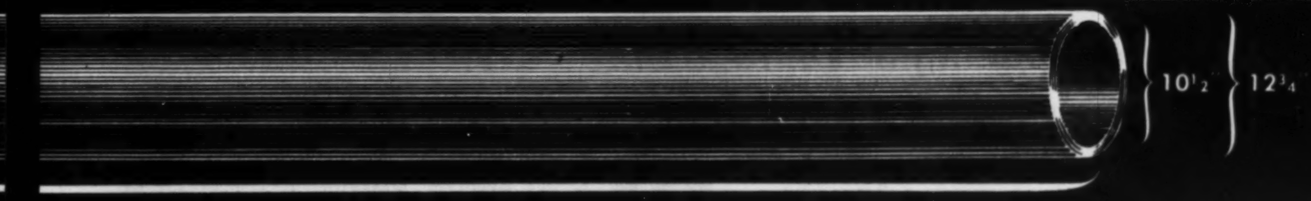
1 SOLUTION...

stainless steel
Centrifugal Castings

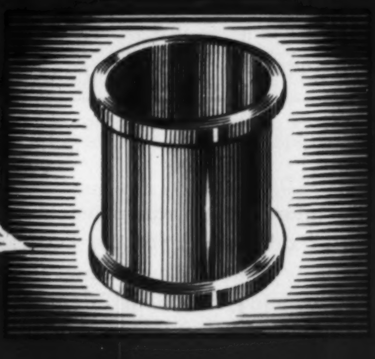
Heavy Wall stainless steel pipe, centrifuge bowls, hollow billets for finely drawn hypodermic needle tubing . . .

These are among the many end uses for metal mold centrifugally cast cylindrical shapes. They are typical of the exacting, difficult service conditions to which this product is subjected. All three examples shown demonstrate the fundamental versatility of this manufacturing process—unequaled product soundness—from hypodermic needle stock subjected to the repeated stresses of cold reduction, to the centrifuge bowl spun at 1800 RPM, to the petrochemical plant reactor piping that must pass hydrostatic pressure tests equal to 90% of the Yield Strength of the metal. These are the proving grounds of quality—of the ability to meet even the most exacting of product specifications.

We welcome your inquiries. For descriptive literature on the versatile metal mold process, write to United States Pipe and Foundry Company, Special Products Division, Burlington, N. J.



Hollow Billets for cold reducing into small diameter seamless tubing, even down to hypodermic needles—ultimate proof of metal soundness! Many so-called non-pierceable grades of pipe and tubing can be hot or cold reduced from centrifugally cast billets.



Centrifuge Bowl Shells produced from multiple length sections and machined to shape desired.

Study these advantages for your cylindrically-shaped products

- Reduced processing time and increased production.
- Design of parts to suit the specific job requirements by selecting the correct alloy—not the next best available alternate.
- Conservation of expensive metals and alloys—especially on tubular parts now produced from solid sections.

SIZE RANGE AND COMPOSITION FLEXIBILITY

Outside Diameter—4" to 36"

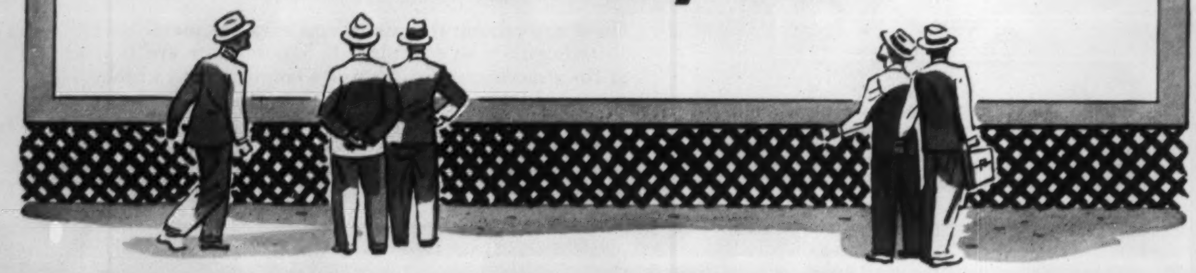
Wall Thickness—⅜" and up

Length—Up to 16' in the "as-cast" condition

Types of Stainless Cast—All Standard AISI and ACI grades of ferritic and austenitic stainless, including No. 20 Alloy, 17-4 P H, 17-7 P H and E.L.C. grades.

SIMPLEX Ferrochrome

the most economical grade of low-carbon ferrochrome ...for any use



Are you taking advantage of the savings possible with ELECTROMET'S SIMPLEX Ferrochrome?

Less than 0.01% Carbon

ANALYSIS	"SIMPLEX" NO. 1 ALLOY	"SIMPLEX" NO. 2 ALLOY
Chromium	63 to 66%	63 to 66%
Silicon	5 to 7%	max. 1.00%
Carbon	max. 0.010 or 0.025%	max. 0.025%

"Simplex" No. 1 alloy with 0.025 per cent carbon max. and "Simplex" No. 2 alloy are available in nitrogen-bearing grades containing 2 per cent or 5 per cent nitrogen.

CHECK THESE ADVANTAGES:

☑ ELECTROMET's "Simplex" alloy is the lowest priced low-carbon ferrochrome.

☑ The carbon content is extremely low.

☑ The alloy is suitable for producing all grades of stainless steel.

For additional information please contact the nearest ELECTROMET office. Ask for the ELECTROMET booklets entitled, "Melting Low-Carbon Stainless Steel" and "Reducing Period in Stainless Steel Melting." They show the advantages that can be obtained in producing low-carbon stainless steel with "Simplex" ferrochrome.

The terms "Electromet" and "Simplex" are registered trade-marks of Union Carbide and Carbon Corporation.

ELECTRO METALLURGICAL COMPANY
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
OFFICES: Birmingham • Chicago • Cleveland • Detroit
Houston • Los Angeles • New York • Pittsburgh • San Francisco
In Canada: Electro Metallurgical Company, Division
of Union Carbide Canada Limited, Welland, Ontario

Electromet
TRADE-MARK
Ferro-Alloys and Metals

Making good – fast!

NEW the Norton R51 Centerless Feed Wheel

NORTON
ALUNDUM
A80 RR51

Not just the "other" wheel on your centerless grinding setup — not just another feed wheel! But a Norton "Touch of Gold" development that proves the importance of the feed wheel to economical centerless grinding.

Users report latest Norton development a top-performing aid to better, lower cost centerless grinding

Shopmen who have tried the new Norton R51 centerless feed wheel have come out strong for this latest Norton aid to more efficient centerless grinding. Here are some typical R51 performance reports:

"They hold form twice as long as previous wheels."

"No slipping, lighter cut with diamond required when truing."

"An excellent wheel; no chipping, holds a much better corner and dresses easier."

"Eliminates chatter and gives us better all around grinding results."

The secret of this greatly improved performance is in the exclusive Norton manufacturing methods. The unique abrasive-and-bond combination lengthens wheel life, increases form-holding ability, reduces the need for dressing and eliminates slippage. And as a result of close control during manufacture, R51 wheels are consistent throughout — from wheel to wheel and lot to lot.

Finally, you get time-and-money-saving simplification with R51's. Just one grain and grade will handle the widest range of jobs.

Heighten the "Touch of Gold" in your centerless operations by teaming up the new R51 feed wheel with the right Norton grinding wheel. And remember: only Norton offers you such long experience in both grinding wheels and machines to help you produce more at lower cost.

R51 wheels are available in all common feed wheel sizes. For complete facts write to NORTON COMPANY, 95 New Bond Street, Worcester 6, Mass. Distributors in all industrial areas, listed under "Grinding Wheels" in your phone directory, yellow pages. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Massachusetts.

W-1681

NORTON

ABRASIVES

Making better products...
to make your products better

NORTON COMPANY: Abrasives • Grinding Wheels
Grinding Machines • Refractories

BEHR-MANNING DIVISION: Coated Abrasives
Sharpening Stones • Pressure-Sensitive Tapes

CONE
WITH
STEPS
FOUR

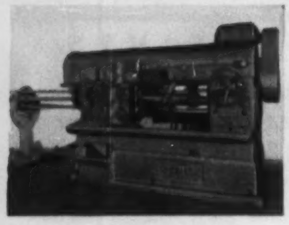
CONOMATIC CARBIDE DEVELOPMENT

First with NEW "Automatic" Service

Cone was the first builder of multiple spindle automatics to provide machine users with an experimental service in the application of carbide tools.

This service is a practical means of determining the possibilities of carbide tools for production men without loss or interference with their regular production schedules.

A pamphlet "FOUR STEPS WITH CONE" describes this service. Send for your free copy.



Conomatic

CONE AUTOMATIC MACHINE COMPANY, INC., WINDSOR, VT., U. S. A.

How
forged weldless
rings
and
flanges...
improve your
product and
cut your
costs
Standard Steel Works Division
BLH
BALDWIN-LIMA-HAMILTON

free! this informative booklet on...

"How forged weldless rings and flanges improve your product and cut your costs"

Standard Steel Works Division
BALDWIN-LIMA-HAMILTON

When you consider a change in your product, you expect that change to make money for you or to save money for you.

It's quite possible that Standard Steel Forged Weldless Rings and Flanges will do *both*.

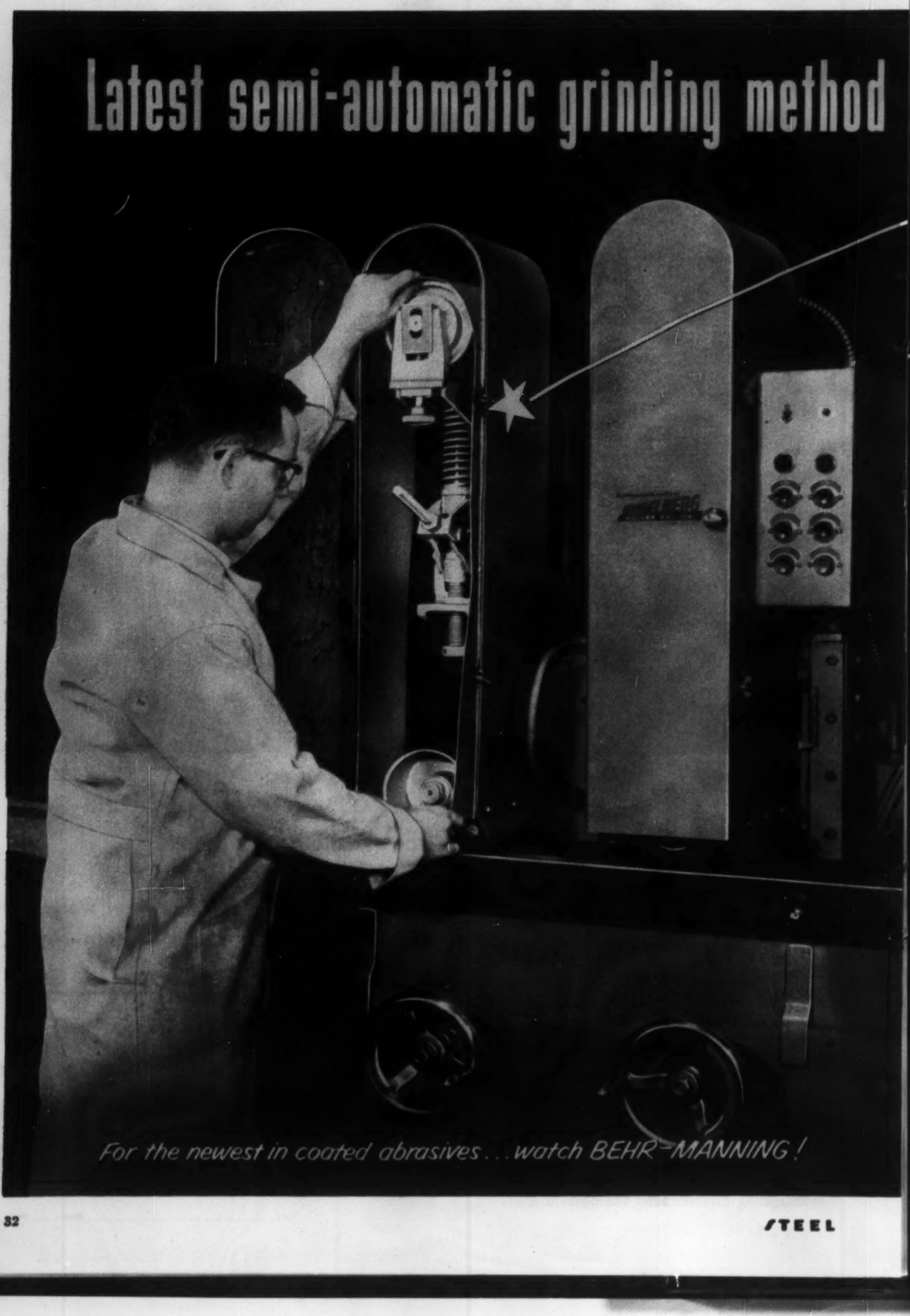
They improve your product, thus making your sales task a little easier, and they cut your manufacturing costs. In many cases, first cost may be less than the component you now use, and always machining time is less.

In checking through this detailed booklet, you'll be able to determine in five minutes or less whether they're worth investigating further. Send the coupon now.

Dept. 8746, Standard Steel Works Division
Baldwin-Lima-Hamilton Corporation, Burnham, Pa.

Please send me Bulletin No. 10,000, "How Forged Weldless Rings and Flanges Improve Your Product and Cut Your Costs."

Name____________________ Title__________
Company______________________________
Address______________________________
City__________________ Zone_____ State______

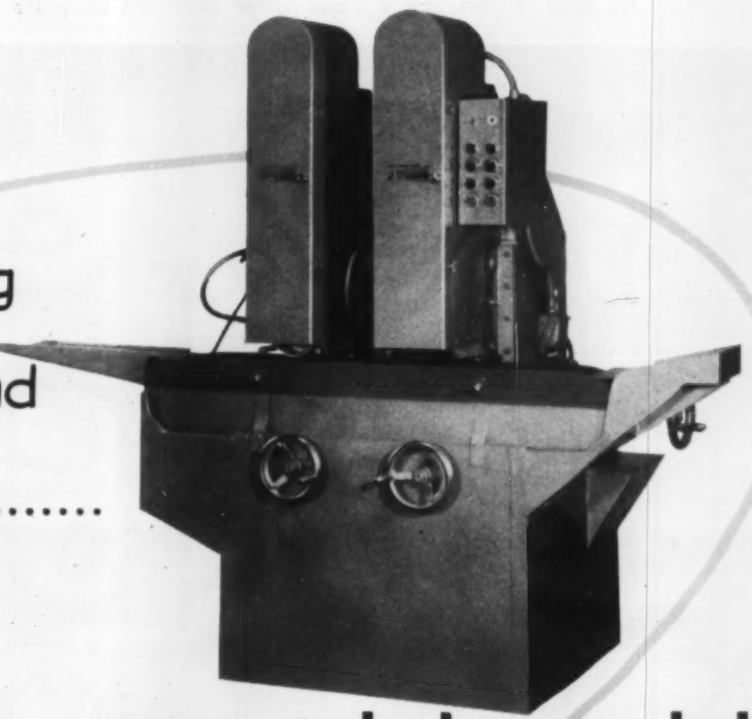

Latest semi-automatic grinding method
For the newest in coated abrasives . . . watch BEHR-MANNING!

.........with the

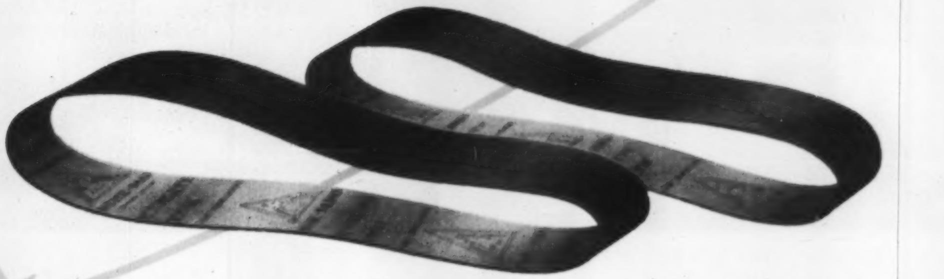
Engelberg

multi-head

machine........



and Behr-Manning coated abrasive belts!



Here is another modern coated abrasive belt application that's answering industry's demands for increased grinding and polishing production. The conveyor-type Engelberg grinder rolls out flat surface pieces at record-breaking speeds . . . eliminates fixtures . . . and greatly reduces costly set-up time. BEHR-MANNING abrasive belts, smooth the way to superior operations, whether it's rapid stock removal while grinding, or superfine finishes during polishing.

Your finishing operations might require an entirely different abrasive belt application. If so, check with your nearest BEHR-MANNING Demonstration Room for the latest time-saving method. Call your local BEHR-MANNING Representative, or write direct to Behr-Manning, Troy, N. Y., Dept. S-12.

In Canada: Behr-Manning (Canada) Ltd., Brantford.
For Export: Norton Behr-Manning Overseas Inc., New Rochelle, N. Y., U. S. A.

G-9

BEHR-MANNING®
division of NORTON Company

▲ COATED ABRASIVES
▲ SHARPENING STONES
▲ PRESSURE-SENSITIVE TAPES

Why Granite City Steel is growing 3 times faster than the industry!

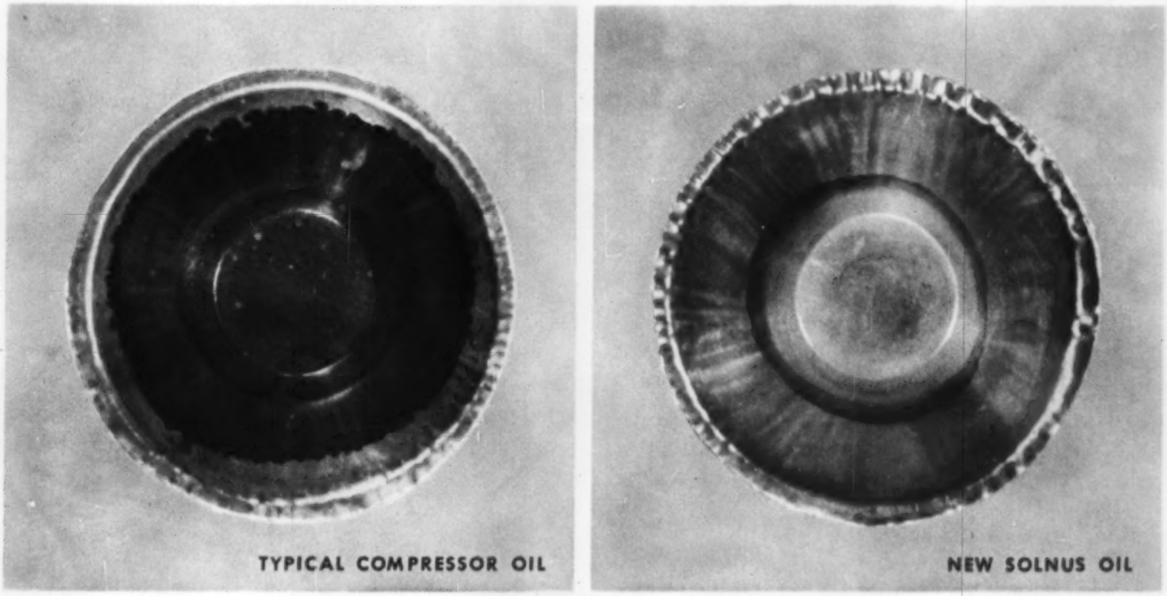
Licking sheet steel problems for 77 years

Somewhere along the line, a steelmaker must make the same decision a doctor must make. Specialist or general practitioner? Granite City Steel decided 77 years ago to concentrate its time, skill and equipment into just one product—the best flat-rolled steel on the market.

This specialization has produced many benefits for Granite City Steel customers. Sheet steel buyers in Middle America have consistently found the *right* answer to their problems here — quicker and less expensively than they could at more diversified mills. Your sheet steel order never competes with other products at Granite City Steel. It gets the undivided attention of experts. Sales offices in St. Louis, Kansas City, Minneapolis, Memphis, Dallas, Houston, Tulsa.

SINCE
GRANITE CITY STEEL
1878

GRANITE CITY STEEL COMPANY
Granite City, Illinois
GRANCO STEEL PRODUCTS CO.
A subsidiary of Granite City Steel Co.



To demonstrate the comparative deposit-forming tendencies of compressor oils, two drops of a typical compressor oil were heated until evaporated. Notice the large deposit, *most of which is carbon*, left by the typical compressor oil. A new Solnus oil, after the same evaporation test, leaves a much smaller deposit.

NEW SOLNUS OILS HELP KEEP COMPRESSORS CARBON-FREE

THREE MINUTE TEST right at your desk shows why Solnus oils are the best for your compressors.

The chief enemy of air compressors is carbon build-up. The best way to avoid this hazard is to use the compressor oil that has the lowest carbon-forming tendency.

Sun's new Solnus oils have been proved to be ideal compressor lubricants. The minute amounts of carbon that form are fluffy and blow away easily . . . assurance against dangerous build-up of carbon on valves and exhaust ports. Tear-downs for cleaning are kept to a minimum.

We'd like to show you, right on your desk top, the dramatic test pictured above. Ask your Sun representative about it the next time he calls or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. SI.

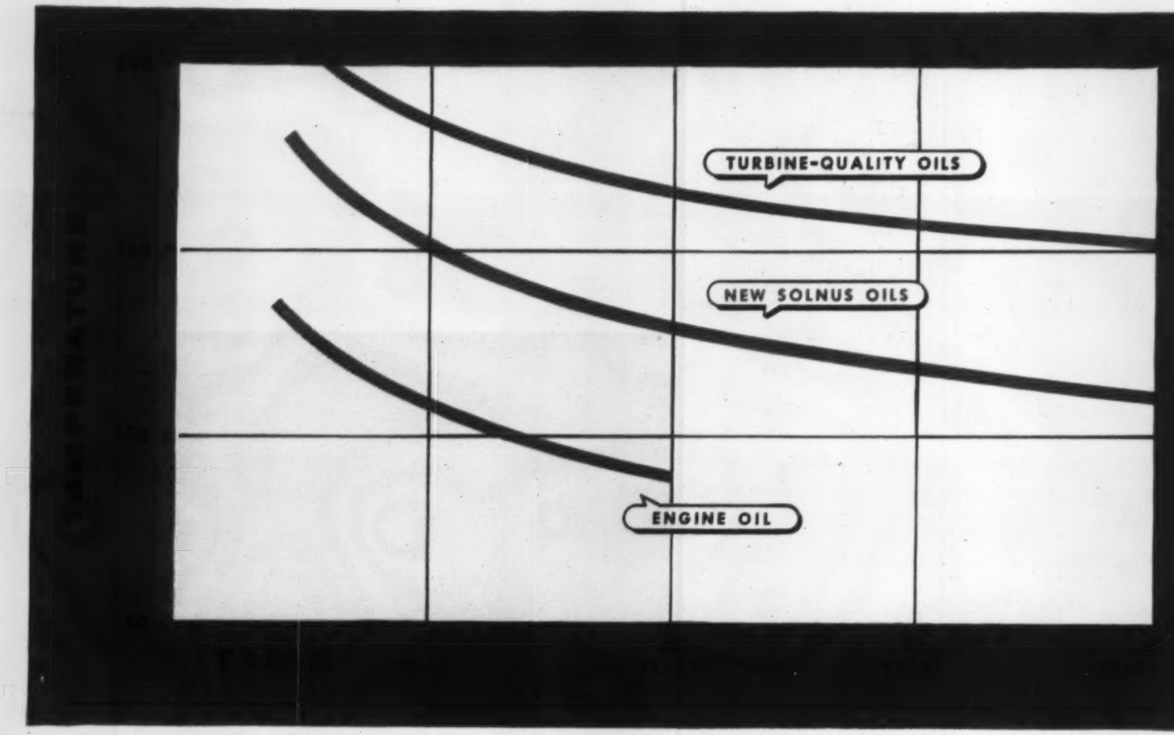
Please turn to the next page

SUNOCO

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY PHILADELPHIA 3, PA.

IN CANADA: SUN OIL COMPANY, LTD., TORONTO AND MONTREAL



This graph is based on 10% make-up per year and a 40-hour week.
The yellow area represents approximately 80% of all applications.

NEW SOLNUS OILS IDEAL LUBRICANTS FOR 80% OF ALL APPLICATIONS

High grade lubricants for squirt-can prices . . . New Solnus oils give more lubrication per dollar

The lubricated parts of most machines—our estimate is 80%—operate at temperatures below 130 F and the time between oil changes is less than 2 years. New Solnus oils were specifically developed to meet these operating conditions at the lowest possible cost.

The above graph compares the service life of new Solnus oils with that of an expensive, turbine-quality oil, and an oil of the type old-timers call "engine oil". The service life of the turbine-quality oil is excellent and probably covers 99% of all applications . . . but for a premium price! The engine oil has a very limited life. It cannot be used safely, except for a very short time, at even moderately high operating temperatures, and it gives very little protection against rust and corrosion.

Now look at the service life of new Solnus oils. They easily meet the service requirements of at least 80% of all oil lubrication jobs and they sell for a squirt-can price! In addition, new Solnus oils are fortified to prevent both rust and oxidation . . . a feature usually found only in more expensive oils.

For the full story on new Solnus oils, see your Sun representative or write Sun Oil Company, Philadelphia 3, Pa., Dept. SI.

SUNOCO

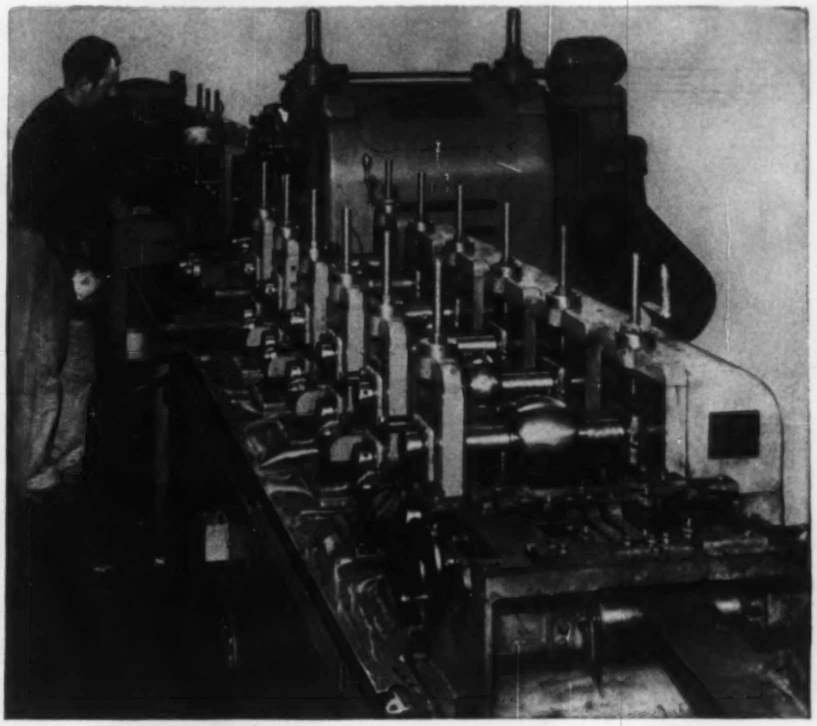
INDUSTRIAL PRODUCTS DEPARTMENT

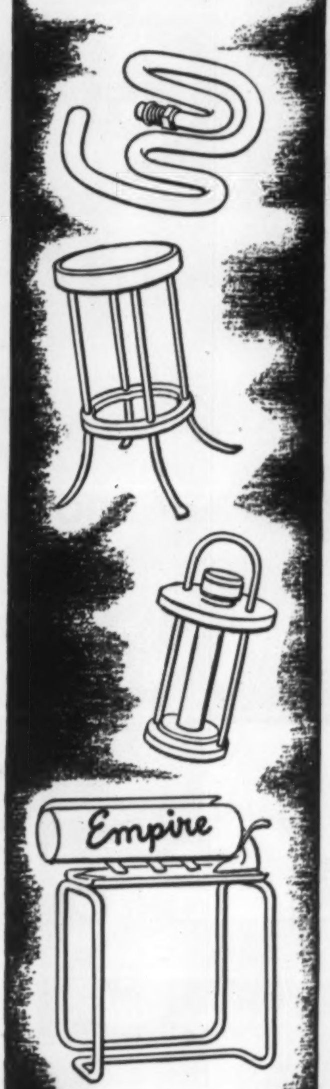
SUN OIL COMPANY

PHILADELPHIA 3, PA.

In Canada: Sun Oil Company, Ltd., Toronto and Montreal

(Right) Yoder M-2½ Tube Mill installed by James Steel & Tube Co., Van Dyke, Mich. for making tubing sizes from ½" to 2½" o.d., incl.





Plain Facts about
ELECTRIC-WELD TUBE MANUFACTURE

In tube making everybody wants the highest possible speed consistent with good, strong welds and dimensional accuracy. There are, in addition, at least three more essentials to profitable tube making, namely:

1. Low scrap losses—because cost per foot of strip metal is many times greater than the conversion cost.
2. Fine exterior finish, free from scratches, scuff marks and other irregularities which limit usefulness and lower salability.
3. Quick and easy mounting and adjustment of tooling, to reduce time losses between successive production runs.

Yoder tube mills excel in all these respects and have other mechanical, electrical and economic advantages. Because Yoder tube mill owners have found from experience their performance is as good as our promise, there are more Yoder mills sold and in operation than all other electric-weld mills combined. This is as true today as it was ten years ago.

If you want the plain facts about the things to look for in a tube mill, to insure most profitable operation over the years, the new Yoder Tube Mill Book will give them to you, in the simplest language and with numerous illustrations.

A copy is yours for the asking.

THE YODER COMPANY
5502 Walworth Avenue, Cleveland 2, Ohio

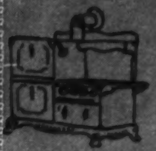
ELECTRIC-WELD TUBE MILLS • SLITTING LINES
COLD ROLL FORMING PRODUCTION LINES

ENGINEERING YODER MANUFACTURING

In the good old days

When the "Silver Campaign Depression" made it difficult to feed our horse, let alone meet the company payroll

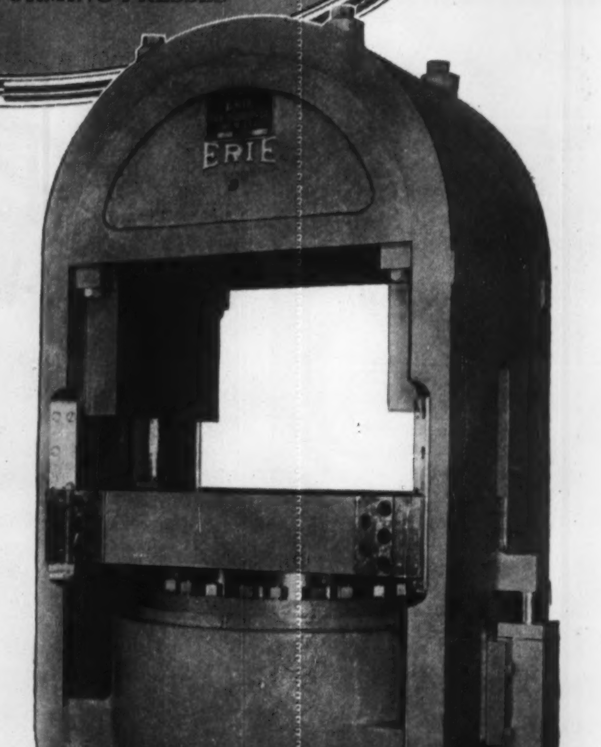
when kitchen stoves were cast iron—and we made stove plate castings . . . when our first ads appeared in such well known magazines as:



HORSELESS AGE
AMERICAN MANUFACTURING
MODERN MACHINERY
THE GAS ENGINEER BULLETIN

ERIE FOUNDRY WAS A GREAT NAME IN SPECIAL METAL-FORMING PRESSES

in today's modern metal working shop



When high labor costs mean more production per machine per hour to make a profit . . .

When exerting tremendous forces means faster shaping of metals . . .

When minimum deflection (less than .002") means almost perfect die matching . . . perfect parts . . .

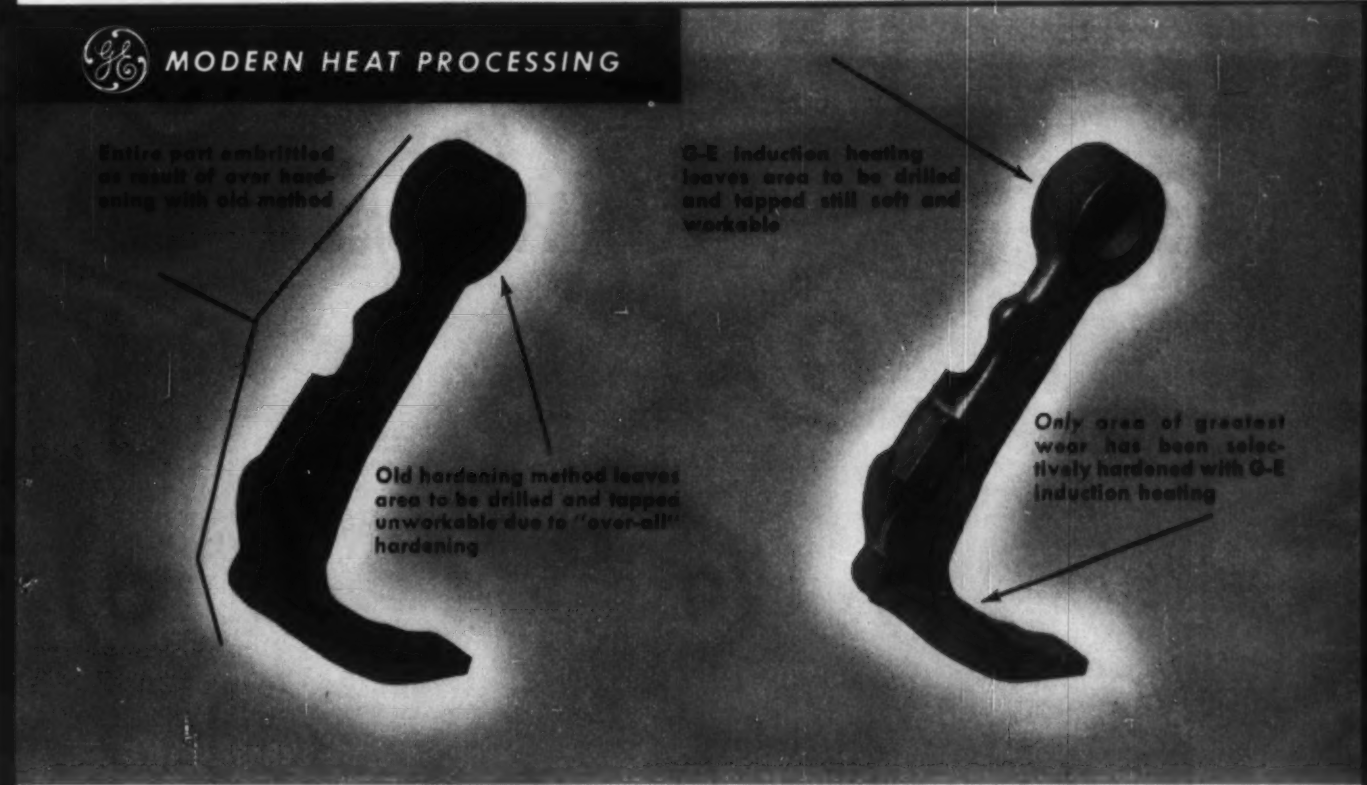
"IN OUR 60TH YEAR"

ERIE

is still the greatest name in special hydraulic metal-forming presses

ERIE FOUNDRY CO. ERIE, PA.

MODERN HEAT PROCESSING


Entire part embrittled as result of over hardening with old method
Old hardening method leaves area to be drilled and tapped unworkable due to "over-all" hardening
G-E induction heating leaves area to be drilled and tapped still soft and workable
Only area of greatest wear has been selectively hardened with G-E induction heating

PROBLEM:

Chill-cast rejects at Draper Corporation due to (1) Embrittlement (2) Over-all hardening

SOLUTION:

G-E Induction Heater Cuts Rejects 95% By Pinpoint Hardening Cast-iron Parts

The East Spartanburg, S. C. division of Draper Corporation was having difficulty controlling the hardening of cast-iron parts. Their old chill-cast hardening method forced them to reject many of the parts, which were overhardened and brittle. In addition, they had no way of controlling the size of the area to be hardened. This made drilling and tapping operations difficult—and frequently impossible.

SINCE INSTALLING A 20-KW G-E induction heater in their production line, they are able to cast the parts, drill and tap them while the cast iron is still soft, and then selectively harden only the area of greatest wear. This "pinpoint" hardening reduces the heated area of the parts by 70–90%. As a result, rejects have been cut 95%, costs are reduced, and the Draper Corporation is producing a product of uniform high quality.

THE COMPLETE SATISFACTION of Draper Corporation with their General Electric induction heating equipment was expressed by Mr. Fred Burgess, Plant Engineer: "Our G-E induction heater has been in operation for over five years. During that time we have greatly reduced manufacturing costs because of our decreased scrap losses and increased production. Maintenance of the heater hasn't been any problem, either. We just couldn't ask for any better service than we've had from our G-E equipment."

GENERAL ELECTRIC

WATCH FOR ANNOUNCEMENT

of General Electric's complete NEW line of electronic induction heaters

For application assistance, contact your nearest G-E Apparatus Sales Office or send coupon for free bulletin GEA-4945.

General Electric Company
Apparatus Sales Division, Section H 722-2
Schenectady 5, New York

Name....................

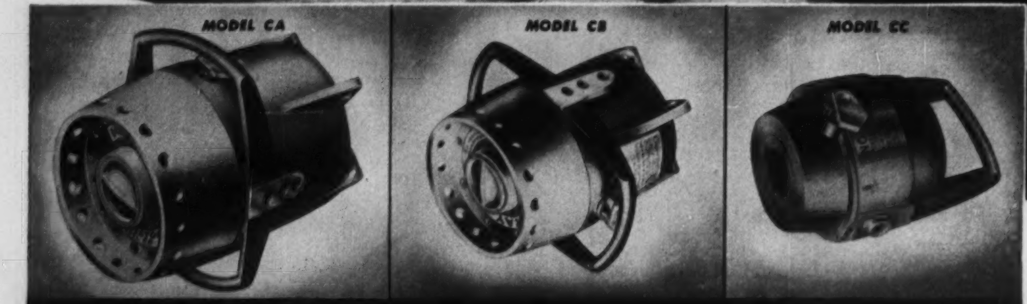
Position....................

Company....................

City.................... State....................

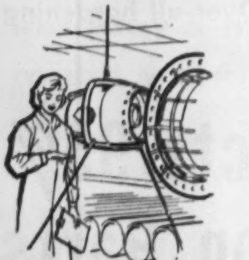
M&T presents the KEL-RAY® Projector

A safe versatile tool for Radiography with gamma rays.



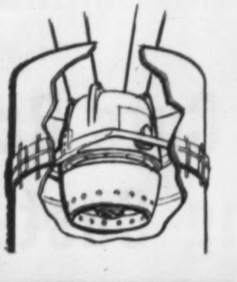
Depending on the projector model and service requirements either encapsulated Cobalt 60, Cesium 137 or Iridium 192 is used as the gamma ray source.

NON-DESTRUCTIVE INSPECTION and TESTING



SAFE

KEL-RAY projectors have extremely low radiation leakage. . . so low they can be shipped and stored without additional shielding. They are tamper, fire, and shock proof. Operated under prescribed procedures, leakage is below the AEC limit.



VERSATILE

A single set-up can produce either spot, doughnut, or hemisphere panoramic radiographs. Thick steel sections can be radiographed; sensitivity is so great even incandescent lamp filaments have been radiographed with a KEL-RAY projector.

CONVENIENT

Designed for field or shop use, the smallest model can be carried by hand—largest is transported and positioned speedily with standard equipment for materials handling and rigging.

ECONOMICAL

Initial and operating costs are low. No delicate parts to pamper or adjust . . . no expensive electrical power source required. Minimized overall set up and exposure time provide further savings.

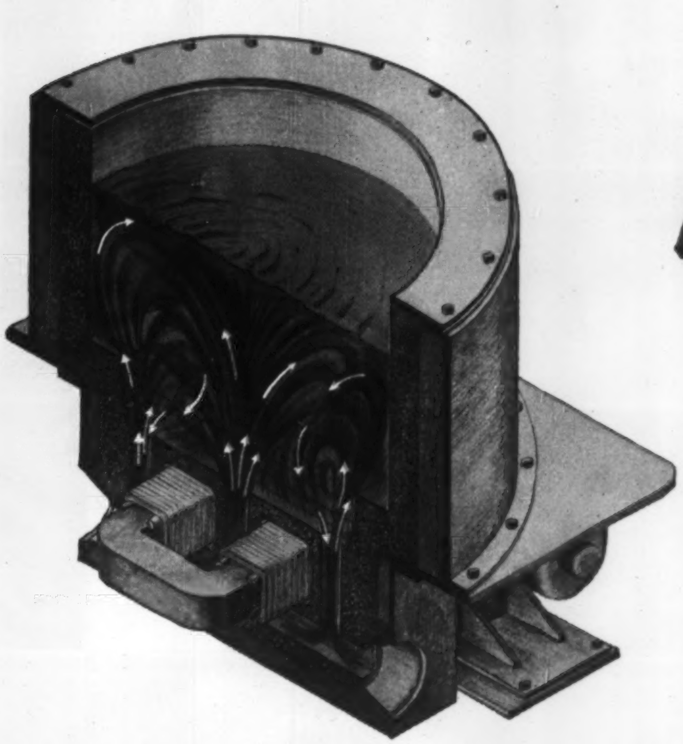
Each of the three KEL-RAY Projector models is a portable, powerful, shielded, self-contained source of penetrating radiation for non-destructive inspection in maintenance, construction or quality control. There is a KEL-RAY Gamma Ray Projector that can improve your operations—save you time and money! Write for detailed literature.

® *Trade Mark of The M. W. Kellogg Company*

* *Sold exclusively by Metal & Thermit Corporation. Designed and manufactured by The M. W. Kellogg Company.*

METAL & THERMIT
CORPORATION
100 EAST 42ND STREET, NEW YORK 17, N. Y.

The Furnace that Stirs Itself!



ELECTROMAGNETIC PRESSURE CIRCULATES MOLTEN METAL

—In this 60 Cycle—

AJAX TAMA-WYATT *Induction Furnace*

Heat is generated only in the melting channels. Controlled stirring *(neither too much nor too little)* guarantees uniformity of metal temperature and alloy composition and also leads to efficient melting of light scrap. Tiresome puddling is eliminated. The metal is held entirely in an inert refractory lining. The atmosphere is cool and free from contaminating gases.

No Other Method Enables such Completely

CONTROLLED MELTING

Today, AJAX builds a complete line of these time-tested furnaces in standard sizes up to 333 kW for the dependable melting of aluminum, brass, copper and zinc. Units for special applications are carefully engineered to specifications.

TWIN COIL INDUCTORS

Lead Non-Ferrous Melting

The sectional view above shows the twin coil stirring action of the 100 kW Ajax-Tama Wyatt 60 cycle induction furnace. Heat induced in the secondary channels below is conveyed throughout the melt by electromagnetic circulation as shown by the arrows. The 100 kW furnace shown here, is one of a family of twin coil furnaces available today for melting rates from 300 to 10,000 lbs. per hour.

For Further Information, Send For Bulletin R-43

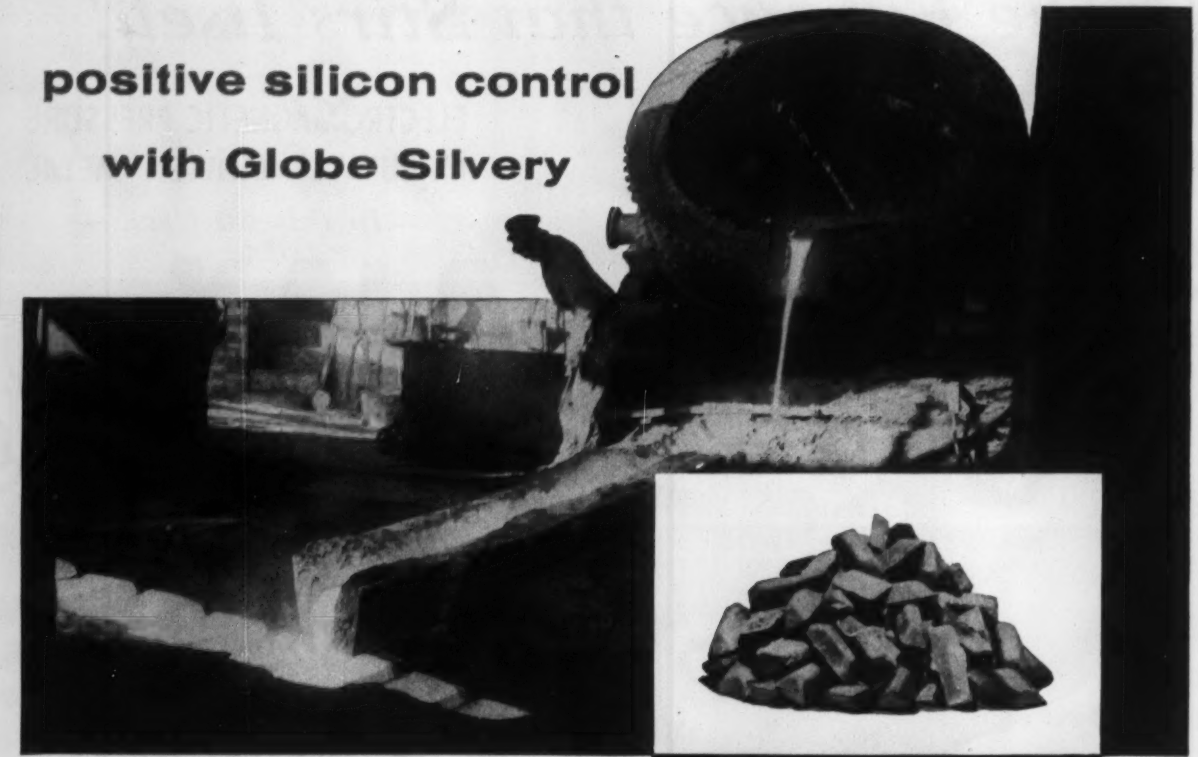
AJAX ENGINEERING CORP., TRENTON 7, N. J.

AJAX TAMA-WYATT

INDUCTION MELTING FURNACE

AJAX ELECTRO METALLURGICAL CORP., and Associated Companies
AJAX ELECTROTHERMIC CORP., Ajax Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., The Ajax Hultgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax Wyatt Induction Furnaces for Melting

positive silicon control with Globe Silvery



The result of long years of research and development, today's Globe Silvery Pig Iron provides accurate silicon control with all grades ranging from 6% to 16% silicon.

Globe originated Silvery Iron, and for 83 years it has remained in a class by itself. Our skilled metallurgical staff is available to help you select the correct grade for your specific requirements.

SILVERY IRON
GLOBE
FERROALLOYS

MANY IMPORTANT ADVANTAGES

- Made from all-virgin ore.
- Uniform grain structure.
- Uniform melting and even silicon distribution in the cupola assured by shape and small size.
- Better and more uniform recovery due to less oxidation.
- No deterioration from weathering.
- Readily identified because of size and shape.
- Can easily be handled by magnet or by hand (average pig weight only 15 pounds).

PICKANDS MATHER & CO.

CLEVELAND 14, OHIO
CHICAGO • CINCINNATI • DETROIT • DULUTH
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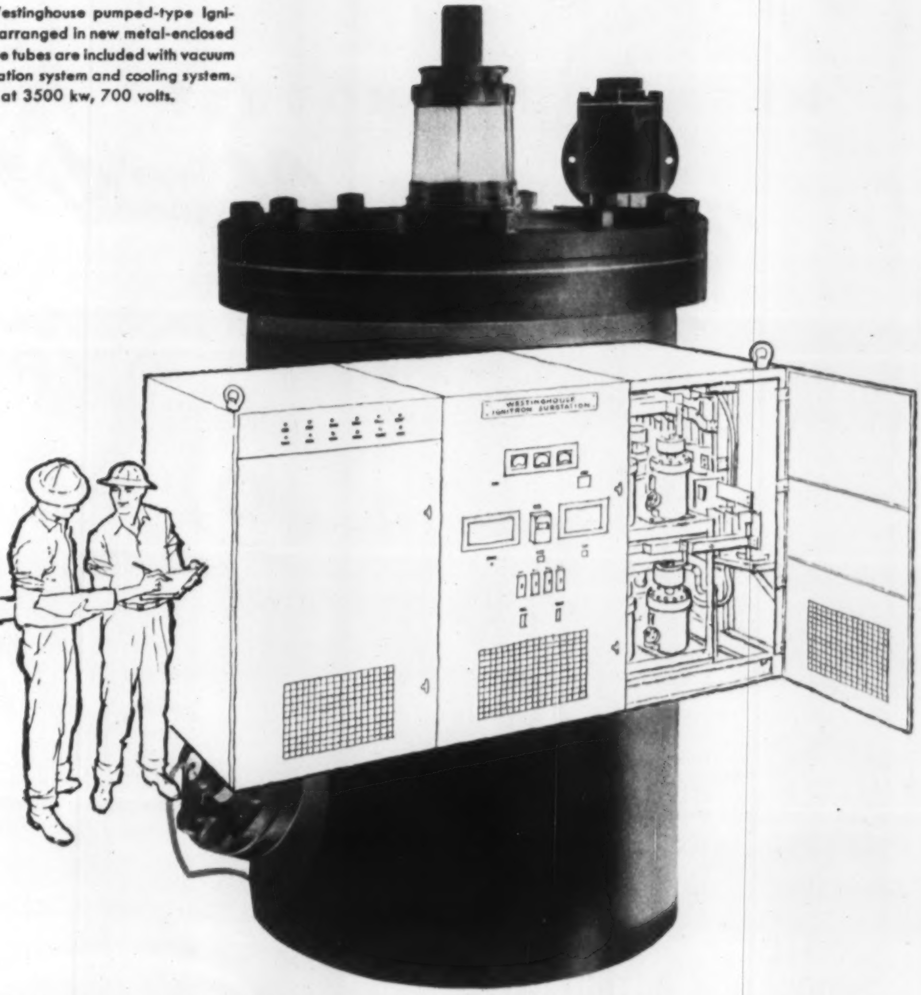
Serving Industry Since 1883

IRON ORE • PIG IRON • COAL • COKE • FERROALLOYS

This is the Westinghouse pumped-type Ignitron rectifier arranged in new metal-enclosed design. Twelve tubes are included with vacuum system, excitation system and cooling system. Unit is rated at 3500 kw, 700 volts.



Pumped Ignitron rectifiers now "packaged" for more safety, compactness . . . easier installation

The rectifier with millions of installed kw behind it gives you d-c power with these 5 big advantages.

Complete metal enclosure—This new d-c conversion "package" is completely wired and completely self-contained—giving extra savings in installation cost and time. Easily close coupled to transformer and switchgear.

Always safe—"Dead" front of the metal enclosure is a big extra feature, makes it practical to install in open areas.

Less floor space—Everything has been compacted into a much smaller area—save on plant space and floor area.

Easy to Install—Can go in on any reasonably level floor, nothing special needed because of light weight and absence of vibration.

Westinghouse pumped Ignitrons last and last! This conversion package has indefinite life, can be easily serviced in the field. The first pumped Ignitron, installed in 1937, is still performing efficiently!

Call your local Westinghouse sales engineer or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

J-10447

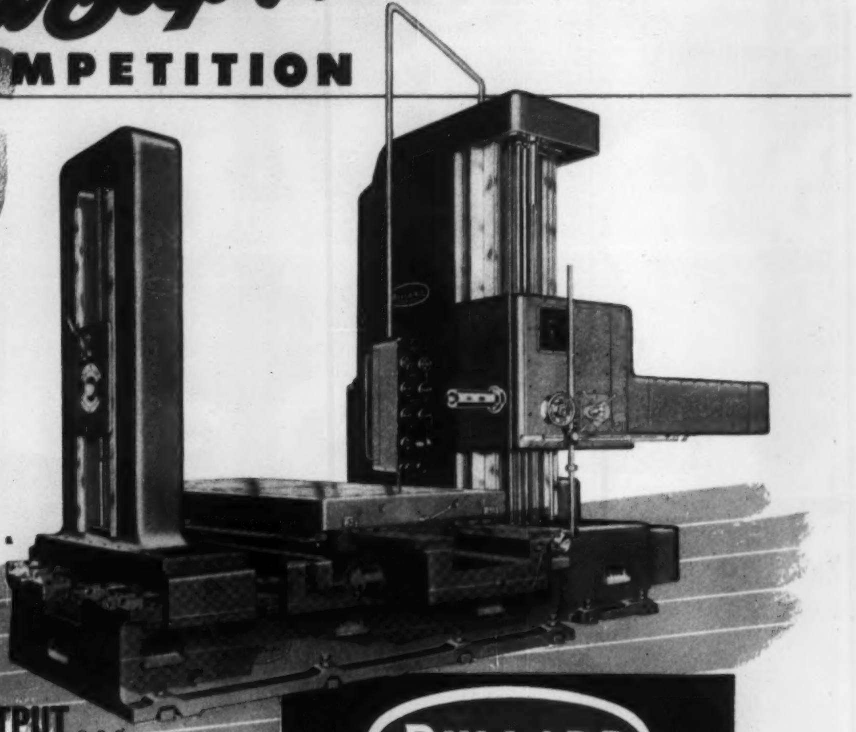
D-C CONVERSION PACKAGES—FOR ALL RANGES—WITH PUMPED OR SEALED IGNITRONS

YOU CAN BE SURE...IF IT'S
Westinghouse

KEEP YOUR PRODUCT

a Step Ahead of

COMPETITION



THROUGH LOWER COSTS...

INCREASE EFFICIENCY...

GREATER PRODUCTION OUTPUT...

BULLARD

HORIZONTAL BORING, MILLING AND DRILLING MACHINE

Model 75

Unless your present equipment is as modern as the Bullard Horizontal Boring, Milling and Drilling Machine, Model 75, you are not employing all of today's engineering achievements to your manufacturing methods.

You owe it to yourself to investigate the many advantages to be gained by using the Bullard Horizontal Boring, Milling and Drilling Machine, Model 75 in your plant.

HERE ARE SOME OF ITS FEATURES:

PENDANT CONTROL — complete machine control from a movable pendant station. Feed and speed rate selection, directional feed and traverse engagement of the spindle, head, table and saddle, spindle, spindle rotation and operation of head binders are accomplished from the Pendant.

BOTH SCREW AND RACK FEED — to the spindle provide smooth, steady screw feed for boring and sensitive hand feed for small drilling and tapping.

SPEED RANGES — 9.5 to 2032 R.P.M. on 3", 7 to 1510 R.P.M. on 4" standard and 5.8 to 1209 R.P.M. on 4" heavy duty and 5" sizes, meets any machining requirement.

RIGIDITY — is built into the massive 4-Way Bed, Head, Headpost and Rear Post assuring a higher degree of maintained accuracy.

OPTICAL MEASURING EQUIPMENT — for head and table (optional)

AUTOMATIC POSITIONING — for head and table (optional)

FOR COMPLETE INFORMATION WRITE FOR CATALOG HBM-75 OR CALL YOUR NEAREST BULLARD SALES OFFICE OR DISTRIBUTOR.

THE BULLARD COMPANY

BRIDGEPORT 2, CONNECTICUT

THE DIFFERENCE... *Carpenter* stainless uniformity

These hinge pivot pins for automatic dishwashers were being turned out by "doing things the hard way." Tools had to be reground every eight hours. The ordinary Type 303 steel used wasn't uniform, refused to hold size, and didn't provide the required finish.

This job could easily have been chalked up as a "necessary headache," but someone wasn't satisfied . . . was willing to explore the possibilities for improvement. As a result, Carpenter Stainless No. 8 (Type 303) has brought these worthwhile changes: Tool regrinding is required only every 18 to 24 hours . . . final grinding of the part is eliminated because size tolerances were held so accurately . . . bar after bar machines the same . . . and each part now costs 50% less.

Build your own improvement program with the cooperation of Carpenter . . . originator of the first Free-Machining Stainless. The steel can be in your plant almost immediately if you call your nearest Carpenter Mill-Branch Warehouse, Office or Distributor now. *The Carpenter Steel Co., 139 W. Bern St., Reading, Pa.*

Specify Carpenter . . .
the one stainless job-proved to give you:

easier machining
fewer rejects
smoother finishes
lower production costs

Carpenter STEEL

Free-Machining Stainless Steels

IMMEDIATE DELIVERY from local warehouse stocks — Export Address: Port Washington, N. Y. — "CARSTEELCO"

(Advertisement)

How the Steel Industry Is Fighting Air Pollution

IRON ORE SINTERING

When the public hears about dust and fume control it is often in terms of what has *not* been done. It is important that they should also know what *has* been done, because the record of the steel industry is one of the most progressive.

The purpose of this discussion is to give the executives the facts to prove this point.

Q. *First of all, how can you measure the progress of dust and fume control in the iron and steel industry?*

A. As you know, there are many ways to combat air pollution. Equipment and methods vary in effectiveness, but the industry agrees that electrical precipitators have the highest collection efficiencies. By keeping track of the demand for this high efficiency equipment over the years, we can get a good indication of the importance the industry places on dust and fume control and the progress they are making.

Q. *Do these figures show an increasing interest in this high efficiency equipment?*

A. Suppose we let the figures speak for themselves. Since 1945 precipitator capacity in the steel industry had a greater increase than in any previous ten year period. Precipitators handling about 6½ million cfm were installed during this period.

Q. *But can't you attribute this growth to the increase in steel-making capacity?*

A. Some of this growth is due to expanded production facilities, but that's just a part of it. For instance, iron and steel production has increased about 30% since 1945 — but precipitator capacity has increased about 130% during this same period.

Q. *In the old days, I guess precipitators were used primarily in blast furnaces, weren't they?*

A. That's right. The first one went into operation in 1930. Since then, 169 Research Cottrells have been ordered by the industry.

Q. *What about new applications?*

A. We have a number of new uses that have proven themselves on the job. Open hearths, for instance. In one installation, our precipitators reduced stack discharge to a little over 2 pounds per hour. That's quite a reduction when you consider that the discharge without a precipitator ranged from 75 to 245 pounds per hour.

Q. *I understand your Cottrells are used on some sintering machines now. Is this true?*

A. Yes, we have three in operation and more under construction.

Q. *How about scarfing machines?*

A. This is a recent application which has worked out very satisfactorily. Two precipitators are now in operation on this application.

Q. *Has anything been done on such problems as iron cupolas, electric furnaces, and ferromanganese blast furnaces?*

A. Yes. Installations have been made on all these problems.

Q. *How do you go about developing these new applications?*

A. We work very closely with our customers on these new projects. Our laboratory is a big help, and our 40 years of pilot plant experience plus over 2,000 precipitators give us the kind of experience that leads to the successful engineering of projects like these.

If you would like to have more information about these applications, or if you want to investigate the possibility of using precipitators on other equipment, our nearest representative will be glad to call on you.

RESEARCH-COTTRELL, INC.

A Wholly Owned Subsidiary of Research Corporation

MAIN OFFICE AND PLANT: BOUND BROOK, N. J.

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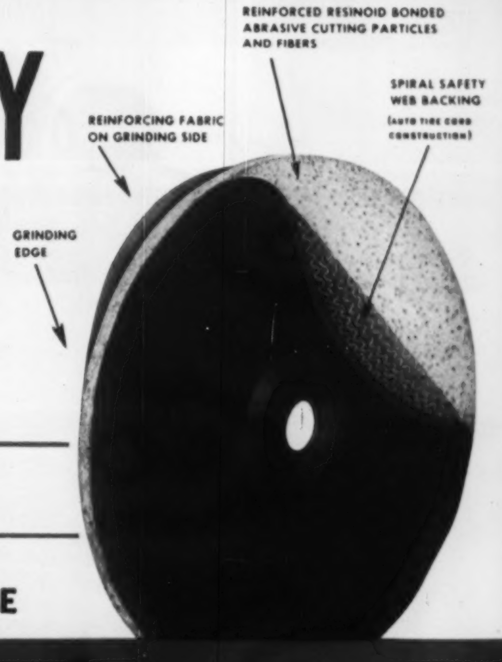
Grant Building, Pittsburgh 19, Pa. • 228
N. La Salle St., Chicago 1, Ill. • 111 Sutter
Bldg., San Francisco 4, Cal.

RC156

STRUCTURALLY DIFFERENT...

FOR EXTRA STRENGTH

EXTRA SAFETY

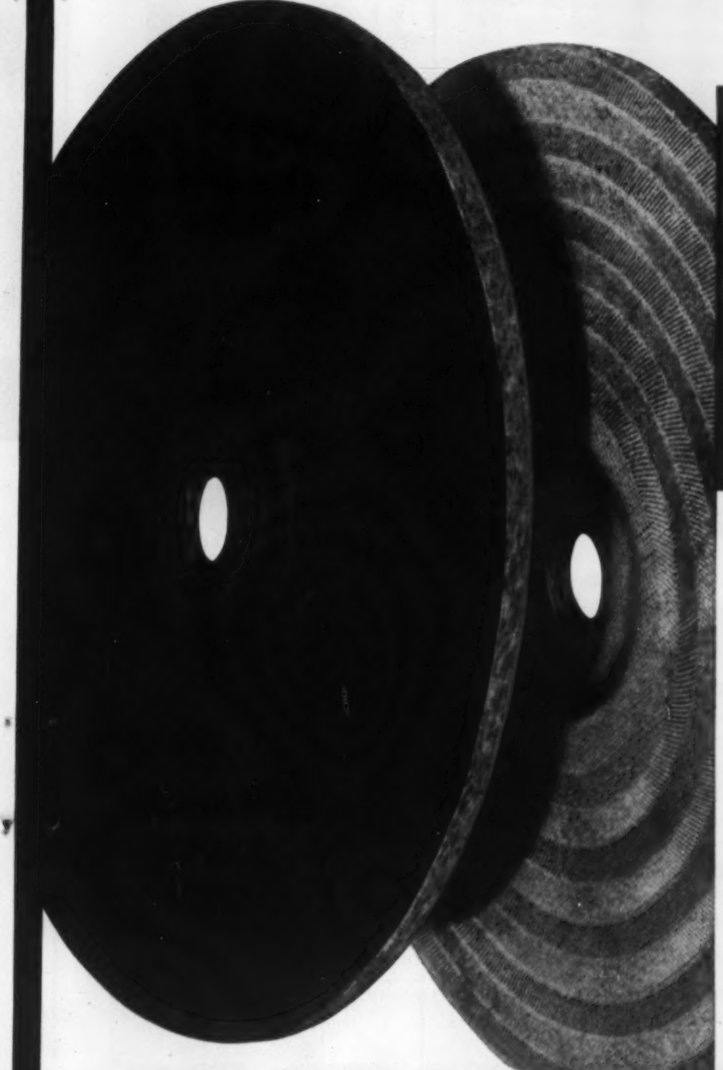

REINFORCED RESINOID BONDED ABRASIVE CUTTING PARTICLES AND FIBERS
SPIRAL SAFETY WEB BACKING
(AUTO TIRE CORD CONSTRUCTION)
REINFORCING FABRIC ON GRINDING SIDE
GRINDING EDGE

IT'S THE

new

SIMEX®
RED WHEEL

SIMONDS
ABRASIVE CO.



For rough, tough production grinding—welds, removing flash and bead; cleaning up rough ragged surfaces and edges. This new lightweight rigid type reinforced resinoid bonded abrasive wheel can give you sensational savings. Use Simex on portable disc type and right angle type portable grinders. Depressed center or raised hub shape; 7″ and 9″ diameter x 3/16″ and 1/4″ thickness.

SEND FOR BULLETIN ESA-244 AND LEARN HOW MUCH BETTER SIMEX IS FOR YOUR JOB

EXTRA SAVINGS FROM YOUR SIMONDS DISTRIBUTOR
STOCK · SERVICE · KNOW-HOW

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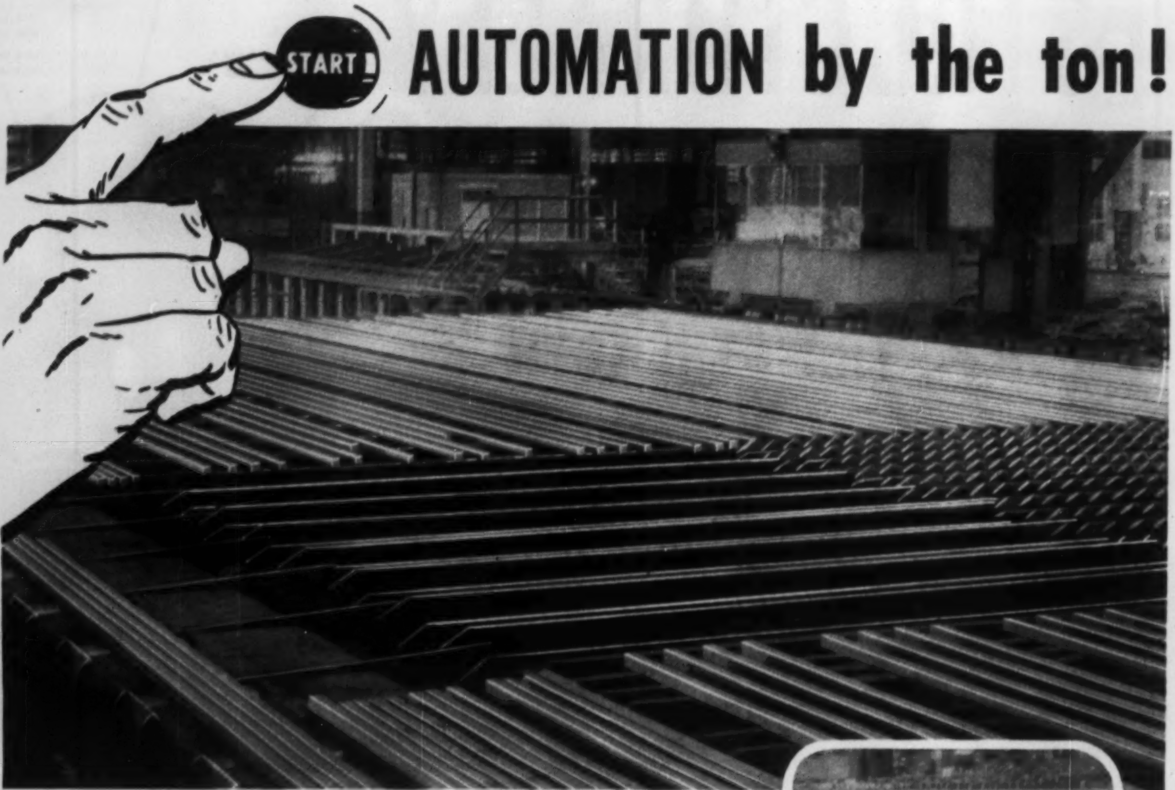
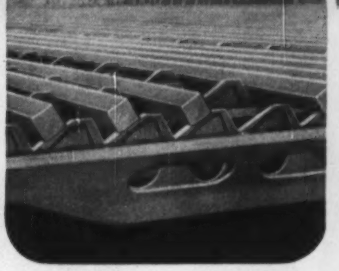
Lion Grinding Wheels Div., Brockville, Ont. and Simonds Canada Abrasive Co., Ltd., Arvida, Quebec

AUTOMATION by the ton!





BIRDSBORO'S

modern design cooling bed...

engineered for maximum production

- It permits maximum production from any mill because cooling beds like this are geared to coordinate the entire operation. This huge bed handles tremendous tonnages of a wide variety of semi-finished products.

The first section of the bed consists of V-bars with either notched or flat surfaces—depending on the type of product handled. These bars are precision machined to hold billets straight during the cooling period. The flat bar section, following the first section, increases the capacity by providing additional cooling time for heavy sections.

This is another Birdsboro product built to meet specifications for higher production in leading steel mills throughout the world. Call on Birdsboro engineers when *your* production figures need a boost.

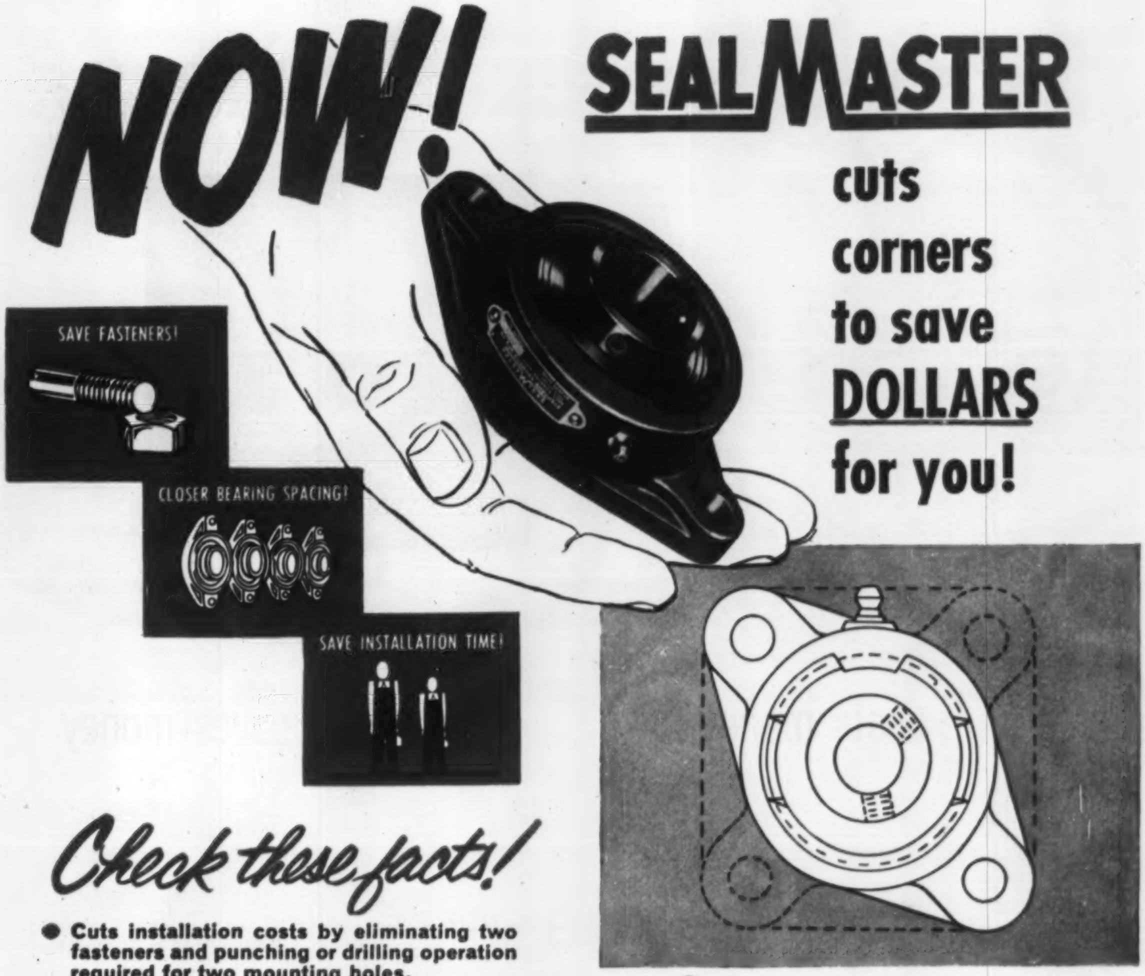
Designers and Builders of:

STEEL MILL MACHINERY
HYDRAULIC PRESSES
CRUSHING MACHINERY
SPECIAL MACHINERY
STEEL CASTINGS
Weldments "CAST-WELD" Design
ROLLS: Steel, Alloy Iron, Alloy Steel

NM 67-56

BIRDSBORO

BIRDSBORO STEEL FOUNDRY & MACHINE CO., BIRDSBORO, PENNA. Offices in Birdsboro, Pa. and Pittsburgh, Pa.


NOW!
SAVE FASTENERS!
CLOSER BEARING SPACING!
SAVE INSTALLATION TIME!

SEALMASTER

cuts
corners
to save
DOLLARS
for you!

Check these facts!

- Cuts installation costs by eliminating two fasteners and punching or drilling operation required for two mounting holes.
- Permits closer bearing spacing on multiple shaft installations.
- As a replacement bearing unit fits the diagonal bolt centers on present four-bolt flange units.
- Carries the same load rating for a given shaft size as four bolt units.
- Retains all patented design features of SEALMASTER Bearing Units—Zone Hardening, Self-Alignment, Locking Pin & Perimeter Dimple and Labyrinth Seal.
- Available in shaft sizes from ½ to 2³⁄₁₆ inches.

New SEALMASTER 2-BOLT FLANGE UNIT

Call your SEALMASTER Distributor or mail this coupon today!

Please send Bulletin SS-125 containing full information on the new SEALMASTER 2-Bolt Flange Ball Bearing Unit.

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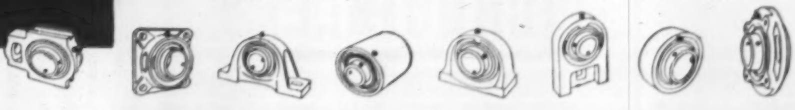
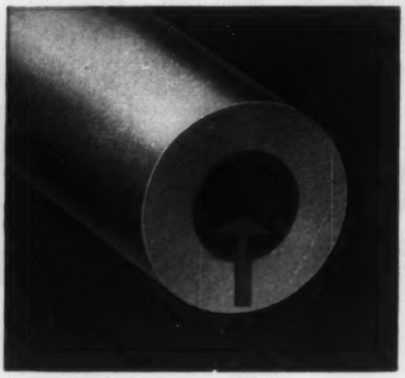
SEALMASTER
BALL BEARING UNITS



SEALMASTER BEARINGS A DIVISION OF STEPHENS-ADAMSON MFG. CO. • 99 RIDGEWAY AVE., AURORA, ILLINOIS

a hole here costs money...



a hole here saves money

Crucible Hollow Tool Steel Bars put savings into the pockets of the metalworking industry. There's no need for costly drilling, boring, cutting-off or rough-facing operations. For the hole is already in the steel you buy. You save production time, machine capacity—avoid scrap losses.

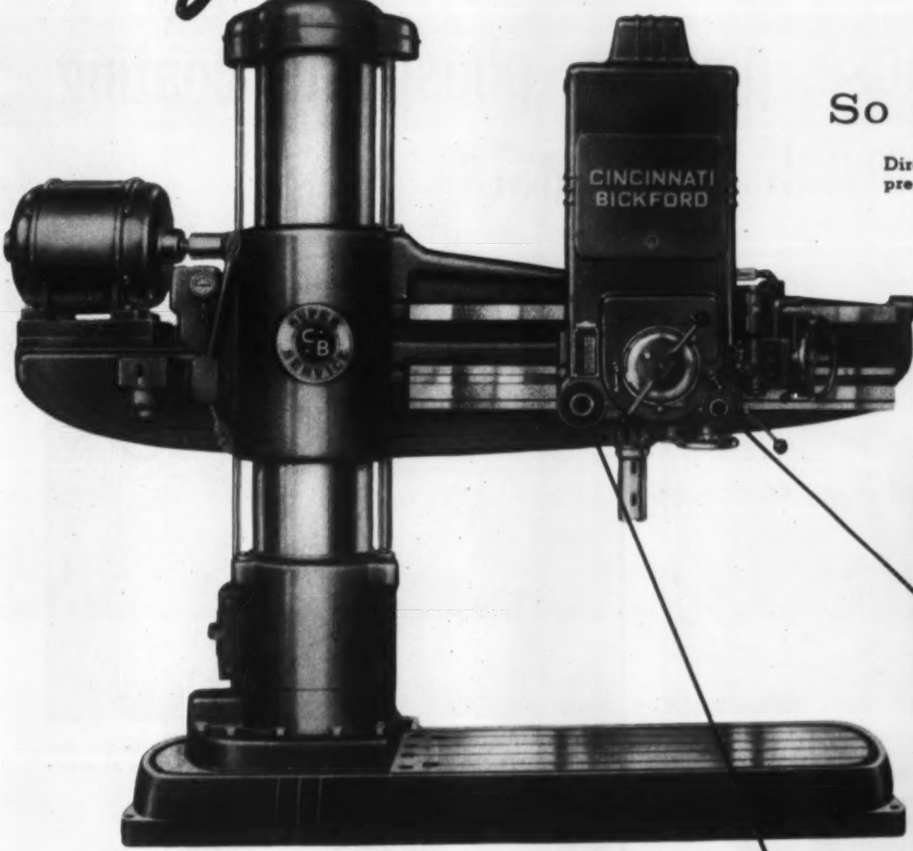
Crucible Hollow Tool Steel Bars are now available in any of our famous tool steel grades , . . in almost any combination of O.D. and I.D. sizes. And you get *immediate* delivery of five popular grades — KETOS oil-hardening, SANDERSON water-hardening, AIRDI 150 high-carbon high-chromium, AIRKOOL air-hardening, and NU DIE V hot-work tool steels.

Your Crucible representative can show you how to save time and money with Crucible Hollow Tool Steel Bars. *Crucible Steel Company of America, Oliver Building, Pittsburgh 30, Pa.*

CRUCIBLE **first name in special purpose steels**

Crucible Steel Company of America

So *quick*. . . So EASY. . .



So SIMPLE . . .

Direct and quiet shifting into pre-selected speeds and feeds.

HYDRAULICALLY PRE-SELECTS all 18 feeds

Positive geared tap leads and feeds are quickly pre-set.

Super-Service Radials are available with complete hydraulic pre-selection of all 36 speeds and 18 feeds. Two convenient direct reading dials control the automatic shifting of sliding gears. While the tool is cutting, merely set the dials to the speed and feed for the next operation. As the spindle is stopping for inserting the next tool, the shifting is done hydraulically . . . directly, quietly and quickly. No other operations—no loss of time. Write for catalogs.

HYDRAULICALLY PRE-SELECTS all 36 speeds

Speeds and tool diameters shown in large easy to read figures.

CINCINNATI BICKFORD

RADIAL AND UPRIGHT DRILLING MACHINES

THE CINCINNATI BICKFORD TOOL CO.

Cincinnati 9, Ohio, U.S.A.

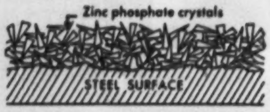
Subsidiary of GIDDINGS & LEWIS MACHINE TOOL CO. : Fond Du Lac, Wisconsin.

Sensational new Actidip

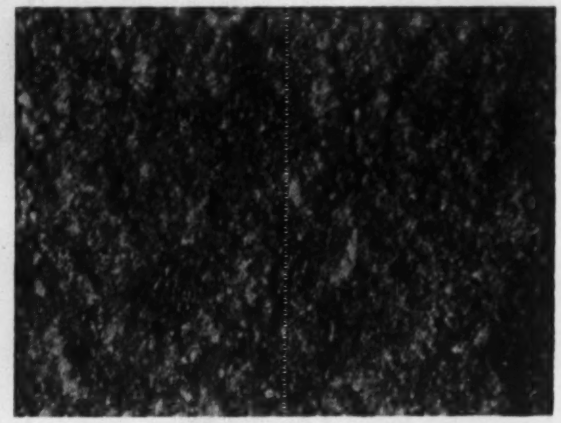
prevents loose, powdery phosphate coating, saves up to half your costs

UNRETOUCHED PHOTOMICROGRAPHS (enlarged 75 times)

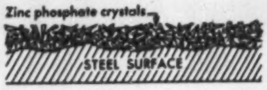
Without Actidip, this panel received a conventional phosphate coating. Typical large crystals, uncontrolled deposition, "wide open spaces" mean heavier coating needed for real protection, more paint needed to cover.



LARGE CRYSTALS on non-activated surface



With Actidip and the Fosbond Process, this panel shows the controlled crystal size and dense packing which lead to a lighter zinc phosphate coating and greatly reduced paint consumption.



SMALL, DENSE CRYSTALS on Actidip-activated surface

ACTIDIP® is the ingredient that makes the Pennsalt Fosbond Process like no other zinc phosphate treatment you've ever seen.

By activating the surface of ferrous or zinc parts to receive an optimum phosphate coating, Actidip works to:

- shorten the processing time in the Fosbond bath;
- reduce the size of Fosbond crystals;
- crowd them evenly and thinly over the metal surface;
- retard formation of sludge in the Fosbond solution.

Even highly-polished, severely-worked, heat-treated steels (usually toughest to phosphatize) are coated successfully — consistently — when Actidip paves the way. *And costs using a Pennsalt Cleaner containing Actidip are about one-fifth the cost of emulsion cleaning.*

THE PAY-OFF IN YOUR PROCESS: (1) Vastly improved corrosion-resistance under organic finishes; (2) reduction in the consumption of phosphatizing chemicals by up to 40%, and of paint by as much as two-thirds; (3) better adhesion and gloss-retention even in one-coat paint systems. Also activated cleaners are balanced so that they don't contaminate the phosphating bath.

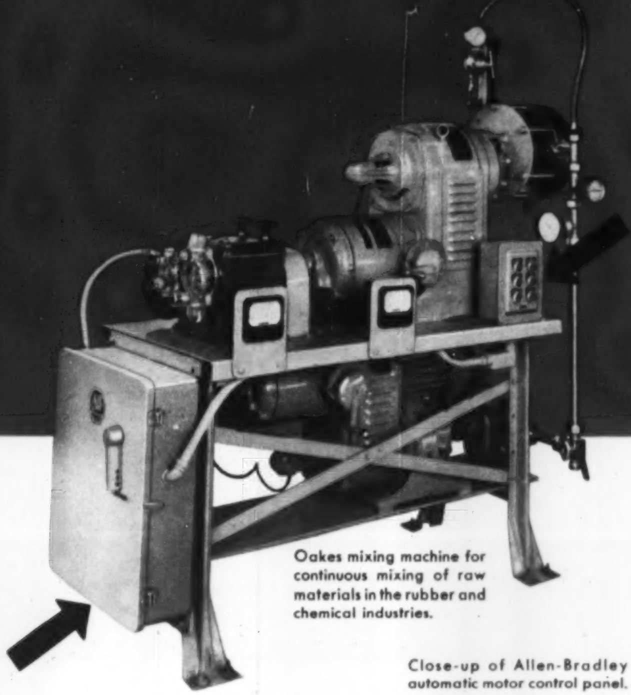
Activate with Actidip . . . phosphatize with Fosbond®—you'll get uniform high quality in paint-bond coatings while actually cutting 'way down on processing costs. Call your Pennsalt service man for a demonstration of Actidip and Fosbond *in your equipment.* Or write to Customer Service Department, Pennsylvania Salt Manufacturing Company, Three Penn Center Plaza, Philadelphia 2, Pa.

Pennsalt Chemicals

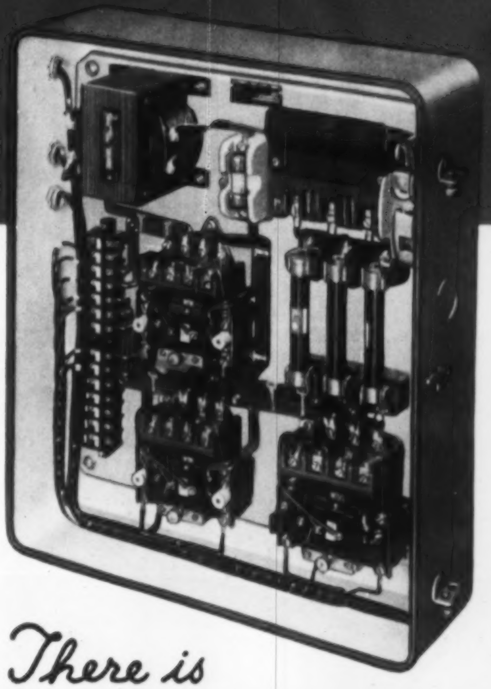
A BETTER START FOR YOUR FINISH

A-B
Quality

The Sign of
QUALITY
MOTOR CONTROL

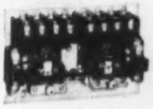


Oakes mixing machine for continuous mixing of raw materials in the rubber and chemical industries.



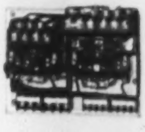
Close-up of Allen-Bradley automatic motor control panel.

Service-tested Components for Automation Control Panels



Reversing Switch

Solenoid Starter



Multispeed Starter

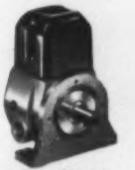
Solenoid Relay

Pilot Switch

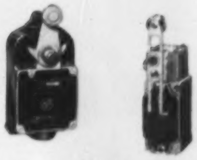
Drum Switch

Pneumatic Timer

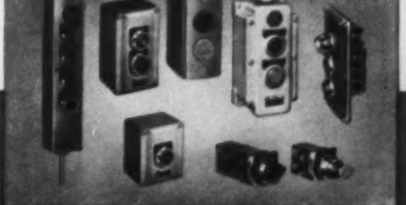
Pressure Switch



Zero Speed Switch



Limit Switches



Push Buttons

There is SALES VALUE for YOU in the A-B TRADEMARK

Time has established the A-B trademark as the sign of Quality in motor controls. It is so recognized by the buyers of your motorized machines. So, why not standardize on Allen-Bradley controls.

Years and years of trouble free service in every conceivable industry has proved conclusively that A-B controls are a real sales asset to any machine. You just cannot beat Allen-Bradley controls for simplicity in design . . . your guarantee for reliable and consistent performance.

Whether you need a single starter or an all-inclusive special control panel, call in your nearest Allen-Bradley sales engineer. Let him recommend the components that will assure the most continuous output from your machines.

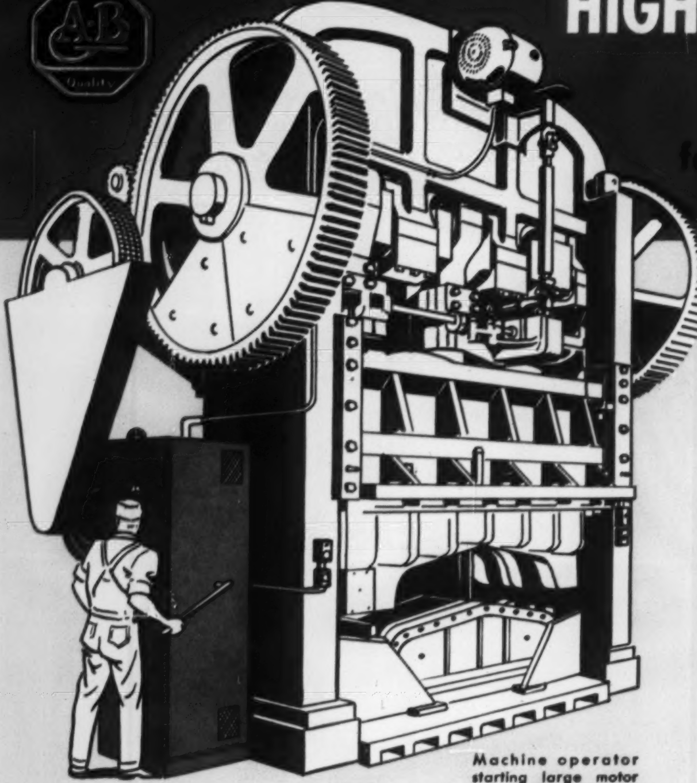
Allen-Bradley Co., 1316 S. Second St.
Milwaukee 4, Wisconsin

In Canada—Allen-Bradley Canada Ltd.
Galt, Ont.

ALLEN-BRADLEY
SOLENOID MOTOR CONTROL
QUALITY

9-55-MB

HIGH & LOW VOLTAGE STARTERS for BIG MOTORS



Machine operator starting large motor with Bulletin 640 manual velvet smooth resistance starter. Starting jolts are eliminated.

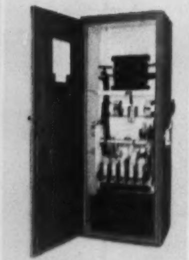
BIG STARTERS for big motors . . . for 220-440-550 volts . . . for 2000 to 2500 volts . . . and for 2501 to 4600 volts . . . are catalog listed units in the Allen-Bradley line. Illustrated below is a limited variety of starters for squirrel cage, wound-rotor, and synchronous motors. Starters for manual or automatic operation are available. Starters for 600 volts or less are available in ratings up to 600 hp. High voltage starters are rated up to 1500 hp.

Write for a copy of the Allen-Bradley Handy Catalog in which all varieties of "big starters" are listed. It is also a handy buyer's guide on the latest developments in controls and accessories.

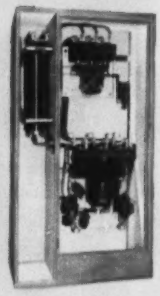
Allen-Bradley Co., 1316 S. Second St.
Milwaukee 4, Wisconsin
In Canada
Allen-Bradley Canada Ltd., Galt, Ont.

ALLEN-BRADLEY
SOLENOID MOTOR CONTROL
QUALITY

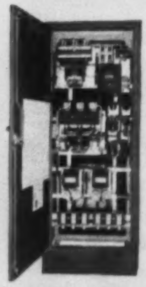
A FEW OF THE BIG STARTERS IN THE ALLEN-BRADLEY LINE



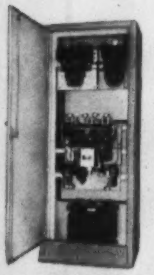
Bulletin 646 manual autotransformer type starter



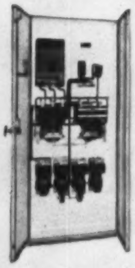
Bulletin 740 automatic reduced voltage motor starter



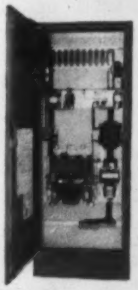
Bulletin 742 automatic starter—velvet smooth acceleration



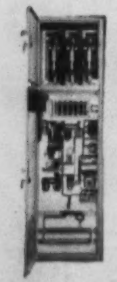
Bulletin 746 automatic autotransformer type starter



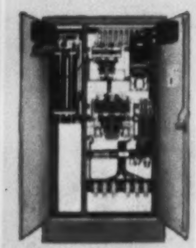
Bulletin 761 automatic wound-rotor motor starter



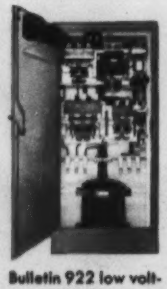
Bulletin 906 across-the-line synchronous motor starter



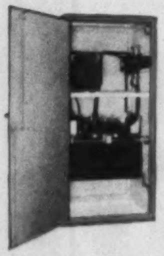
Bulletin 906 high voltage synchronous motor starter



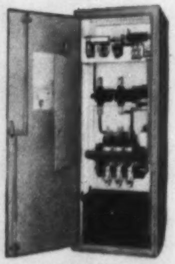
Bulletin 914 reduced voltage synchronous motor starter



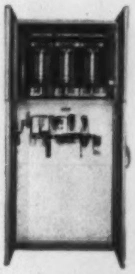
Bulletin 922 low voltage synchronous motor starter



Bulletin 922 high voltage synchronous motor starter



Bulletin 1109 high voltage across-the-line starter



Bulletin 1146 high voltage squirrel-cage motor starter

9-55-MR

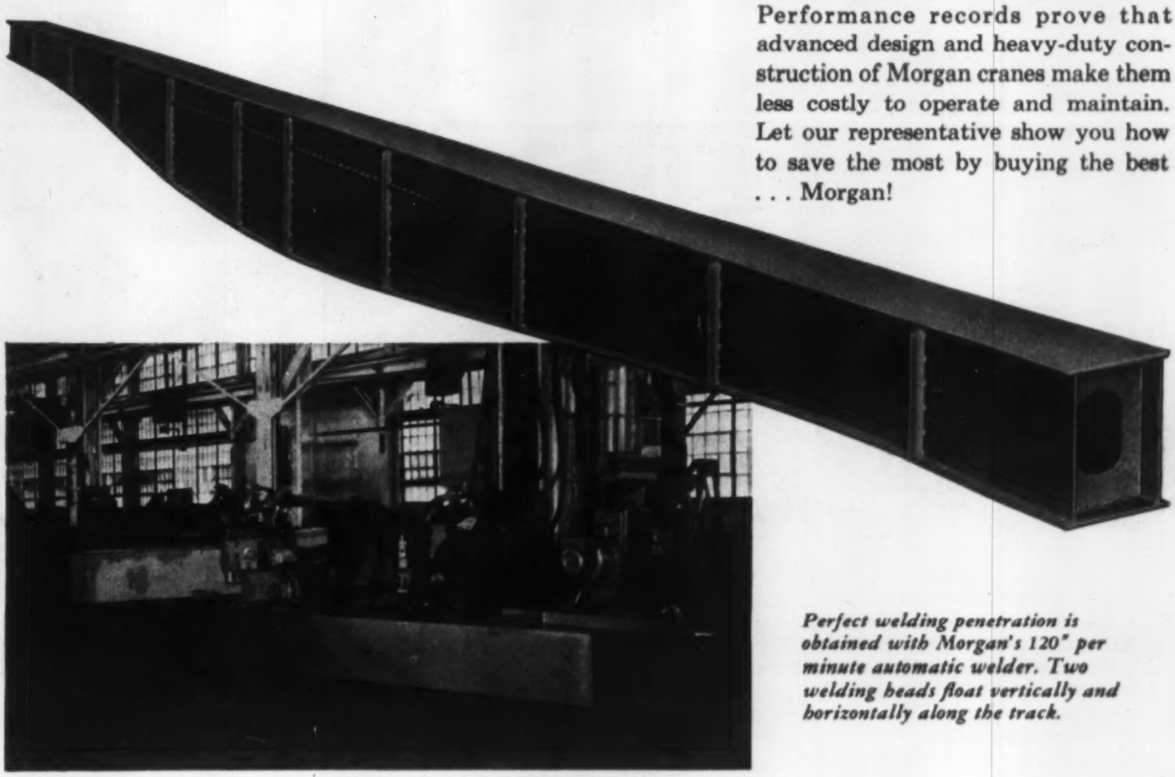
How Morgan cranes get a stiffer backbone ...automatically

● MORGAN CRANES are stronger, more rigid . . . because girder joints and seams are welded automatically on the world's largest continuous welder. Casting imperfections and hand welding variables are eliminated with Morgan automatic welding. All joints are uniform and sound.

Crane drums, too, are welded automatically, making them stronger and lighter. Casting shrinkage voids are eliminated.

Morgan welders are qualified in accordance with A.S.M.E. and A.W.S. codes.

Performance records prove that advanced design and heavy-duty construction of Morgan cranes make them less costly to operate and maintain. Let our representative show you how to save the most by buying the best . . . Morgan!



Perfect welding penetration is obtained with Morgan's 120" per minute automatic welder. Two welding heads float vertically and horizontally along the track.

The Morgan Engineering Company, founded in 1868, manufactures overhead electric traveling cranes, gantry cranes, charging machines, plate mills, blooming mills, structural mills, shears, saws, and auxiliary equipment.

THE MORGAN ENGINEERING CO. *Alliance, Ohio*

(Advertisement)

"After we switched to GAS we upped our production improved our product and lowered our costs."

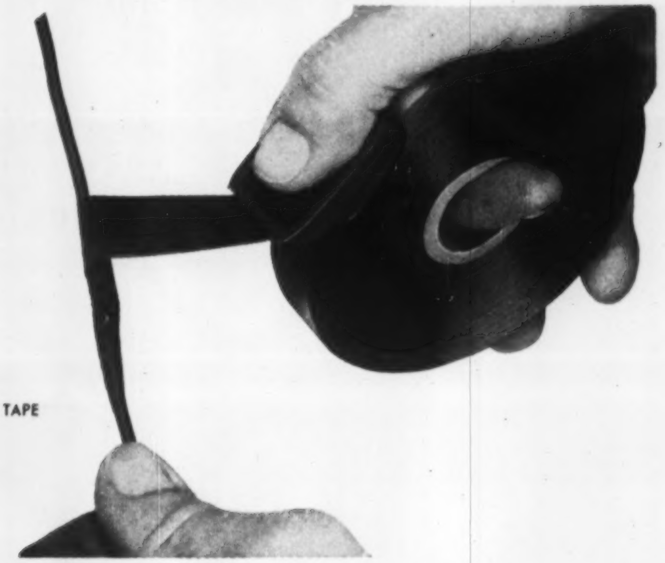
— LITECONTROL

The Litecontrol Corporation in Watertown, Massachusetts, recently installed an overhead Gas oven for baking enamel finishes on lighting fixtures. "This gas conveyor oven saves valuable floor space, operates more economically, and produces a better finished product," says Ralph Sampson, foreman of the operation.

"We also like the controllability of Gas," continues Mr. Sampson. "The precise heats possible with Gas help us make better fixtures of uniform quality."

For further information on how Gas can help you with your process heating operations, call your Gas Company Industrial Specialist. He'll be glad to discuss the economies and results Gas and Modern Gas-fired Industrial Equipment provide. *American Gas Association.*

Whatever the job...



PERMACEL 29 PLASTIC TAPE

splicing or strapping

PERMACEL 15 STRAPPING TAPE

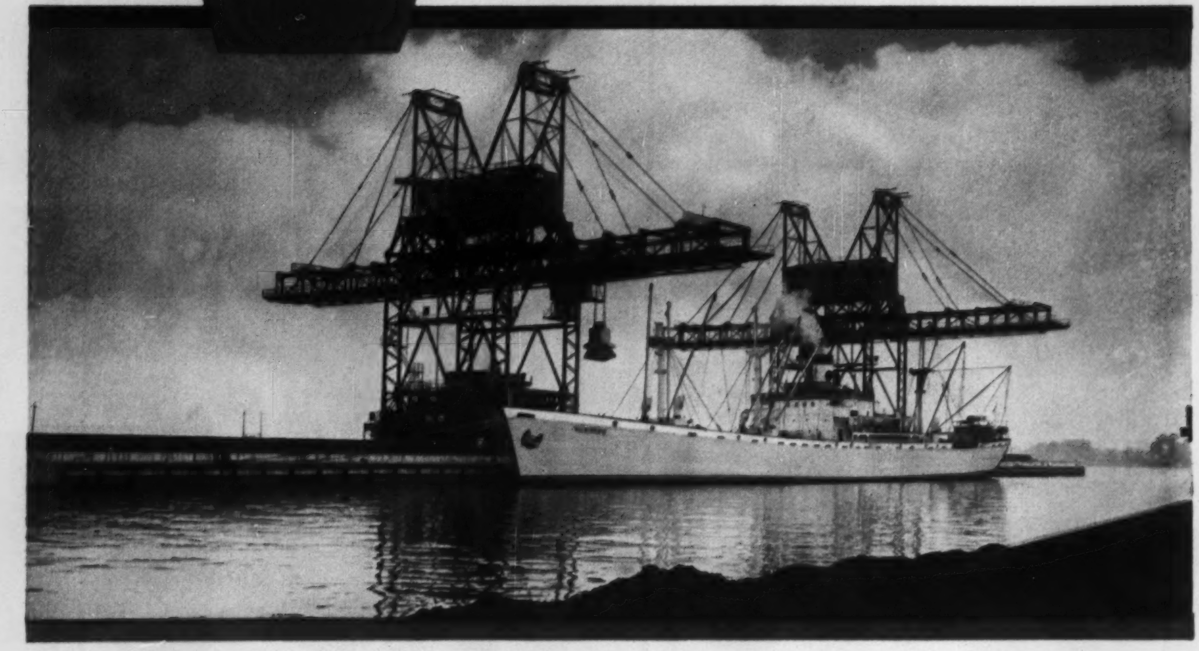
SELF-STICKING

PERMACEL® TAPE

In our ***complete*** *line, there's a self-sticking tape for every job . . . write Permacel Tape Corporation, New Brunswick, N. J.*

a Johnson & Johnson company

new Pennsylvania RR pier handles up to 3600 tons per hour with BROWNHOIST ore unloaders



60 tons a minute! Seems incredible, but that's the production pace set by these two giant Industrial Brownhoist ore unloaders at the new Pennsylvania Railroad pier in Philadelphia, Pennsylvania. Towering over both pier and ocean-going ore vessels, the two enormous Brownhoist machines—each with a free-digging capacity of 1800 tons per hour—provide this ore terminal with the most modern and efficient unloading facilities in the United States. They can travel the full length of the pier and lower apron extensions from either side to obtain a reach of 72 feet from the dock. Each huge 25 ton capacity bucket rolls out, takes a bite, rolls back on the apron to drop its contents into a 100-ton receiving hopper, then rolls out for another bite. Time elapsed from bite to bite? *Just 45 seconds!*

The same engineering experience that made these Brownhoist ore bridges possible has also resulted in other fine Brownhoist materials handling equipment . . . locomotive cranes, wrecking cranes, car dumpers, traveling bridge cranes, buckets. If you have a heavy duty materials handling problem, it will pay you to discuss it with our engineers at Brownhoist.

BROWNHOIST MATERIALS HANDLING EQUIPMENT
GIVES A LIFT TO AMERICAN INDUSTRY

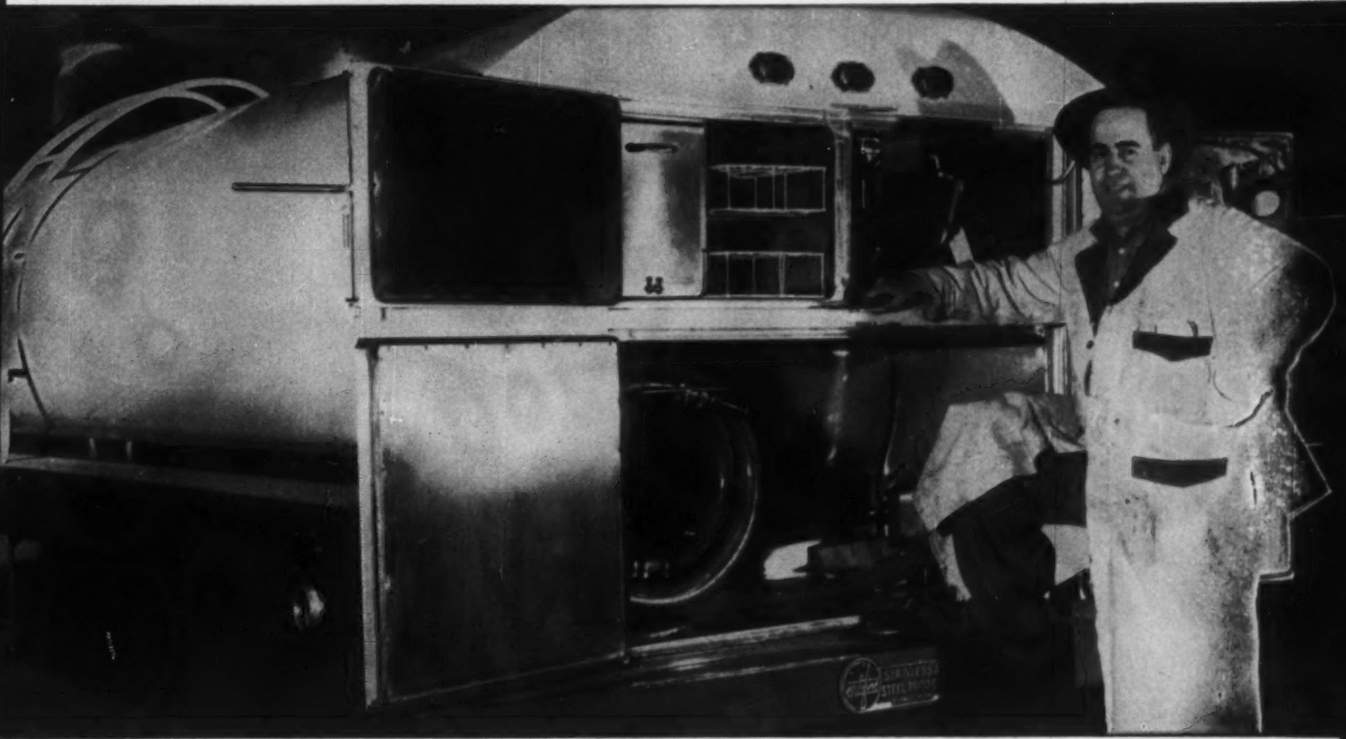
INDUSTRIAL BROWNHOIST CORPORATION
BAY CITY, MICHIGAN • **DISTRICT OFFICES:** New York, Philadelphia, Cleveland, Chicago, Denver, San Francisco, Montreal
AGENCIES: Detroit, Birmingham, Houston

SUBSIDIARY OF Penn-Texas

184

BROWNHOIST

The complete pick-up tank is supplied with sample compartment, pump and hose. Stainless Steel is used for both interior and exterior surfaces. Stainless & Steel Products Company, St. Paul, Minn., is the manufacturer.



This tank truck had to be made from Stainless Steel

Tank shells are rolled on a 10′ roll. Notice adhesive cloth tape used to protect inside surface of tank until job is complete.

The dairy and dairy equipment industries have been awfully busy these past few years, working out ways to reduce costs and maintain the flavor and quality of milk.

One major step has been *bulk milk* pickup. Instead of storing his milk in cans, today's modern farmer uses a Stainless Steel storage tank. Then, every-other-day, the dairy sends a tank truck to pick up the milk. The tank on the truck has to be made from Stainless Steel, because no other metal has such a unique combination of strength, corrosion resistance and cleanability.

The manufacturer of this tank truck uses Types 302 and 304 Stainless Steel—14-gauge shells for tanks 2000 gallons and under, 12-gauge for tanks 2000 to 5000 gallons. Both gauges are sheared, rolled and punched on equipment with a nominal capacity of 3/8″ carbon steel. Holes are cut with a carbon-arc torch, and all fittings are attached with electric arc welding.

If you have been wondering whether you can handle Stainless Steel successfully in your own shop with your present equipment, just remember that fabrication of Stainless Steel isn't difficult — it's just different.

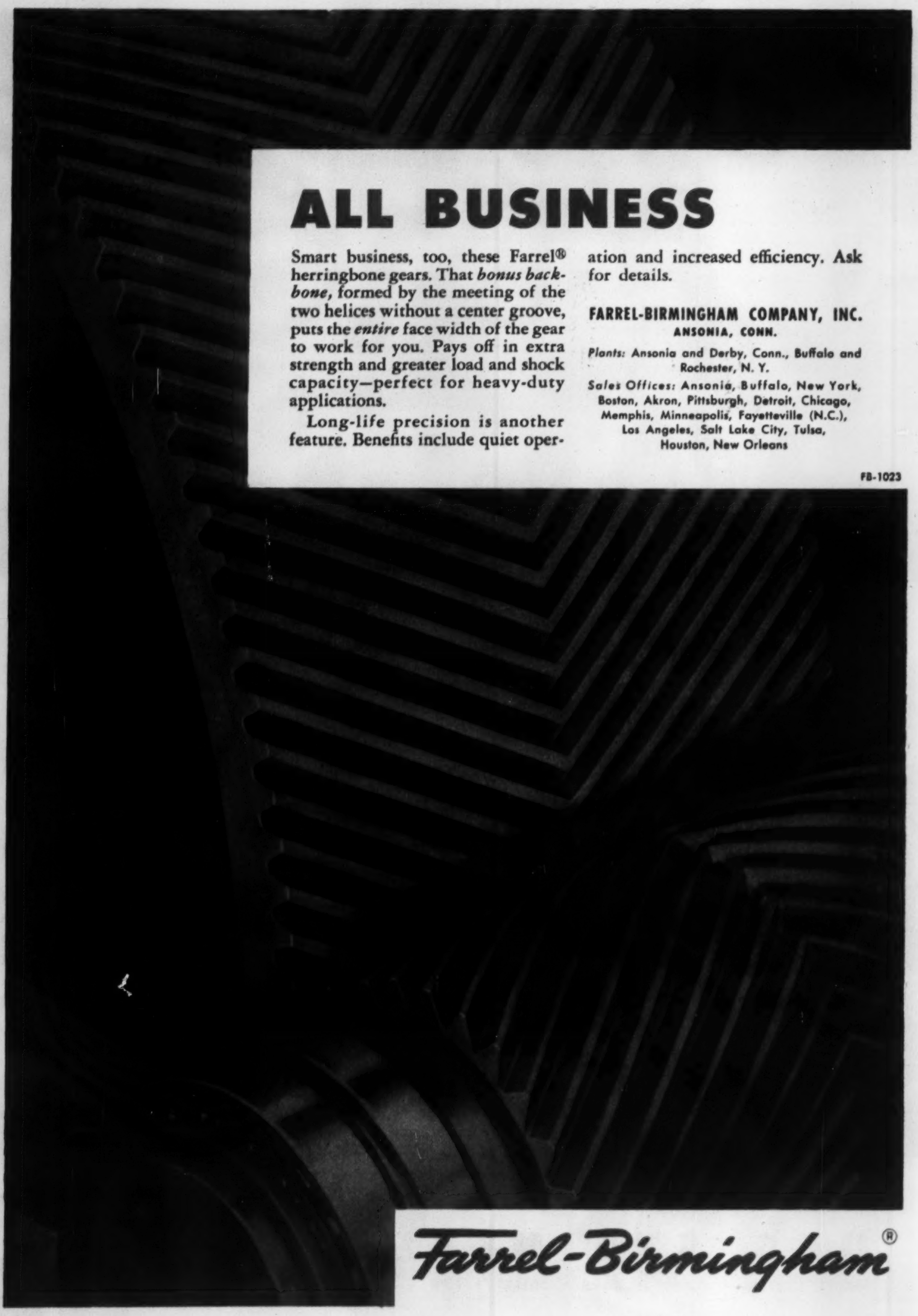
UNITED STATES STEEL CORPORATION, PITTSBURGH
AMERICAN STEEL & WIRE DIVISION, CLEVELAND
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS STAINLESS STEEL

SHEETS • STRIP • PLATES • BARS • BILLETS • PIPE • TUBES • WIRE • SPECIAL SECTIONS

USS

UNITED STATES STEEL



ALL BUSINESS

Smart business, too, these Farrel® herringbone gears. That *bonus backbone,* formed by the meeting of the two helices without a center groove, puts the *entire* face width of the gear to work for you. Pays off in extra strength and greater load and shock capacity—perfect for heavy-duty applications.

Long-life precision is another feature. Benefits include quiet operation and increased efficiency. Ask for details.

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONN.

Plants: Ansonia and Derby, Conn., Buffalo and Rochester, N. Y.

Sales Offices: Ansonia, Buffalo, New York, Boston, Akron, Pittsburgh, Detroit, Chicago, Memphis, Minneapolis, Fayetteville (N.C.), Los Angeles, Salt Lake City, Tulsa, Houston, New Orleans

FB-1023

Farrel-Birmingham®

No More Scaling Here......
Despite Severe Oxidizing Conditions

A vibrating chute made of a HAYNES high-temperature alloy solved a tough maintenance problem in this heat-treating furnace. The chute spans the entrance to the furnace and is subjected to severe oxidizing conditions. Other chutes became loaded with heavy scale in a few months' time and had to be repaired or replaced. Now that the chute is made of a HAYNES high-temperature alloy, there is no more scale. Parts keep flowing along freely, rejections are way down, and maintenance has been practically eliminated.

There are 11 HAYNES high-temperature alloys. All have excellent strength at elevated temperatures, good creep and stress-rupture properties, and are extremely resistant to oxidizing or reducing atmospheres. One of them may be the answer to a production or maintenance problem in your plant.

For information on prices, sizes, and properties of these alloys, write to our general sales office in Kokomo, Indiana, or to any of the district sales offices listed below.

HAYNES
TRADE-MARK
ALLOYS

HAYNES STELLITE COMPANY
A Division of Union Carbide and Carbon Corporation
UCC
General Offices and Works, Kokomo, Indiana
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Chicago · Cleveland · Detroit · Houston · Los Angeles · New York · San Francisco · Tulsa

"Haynes" is a registered trade-mark of Union Carbide and Carbon Corporation.

Drive mounting problems erased with Westinghouse *Life-Line** Gearmotors

Putting the best drive in the minimum space is a problem constantly facing design engineers. In answer to this problem, Westinghouse Life-Line Gearmotors provide unit compactness, rugged construction and job-proved efficiency.

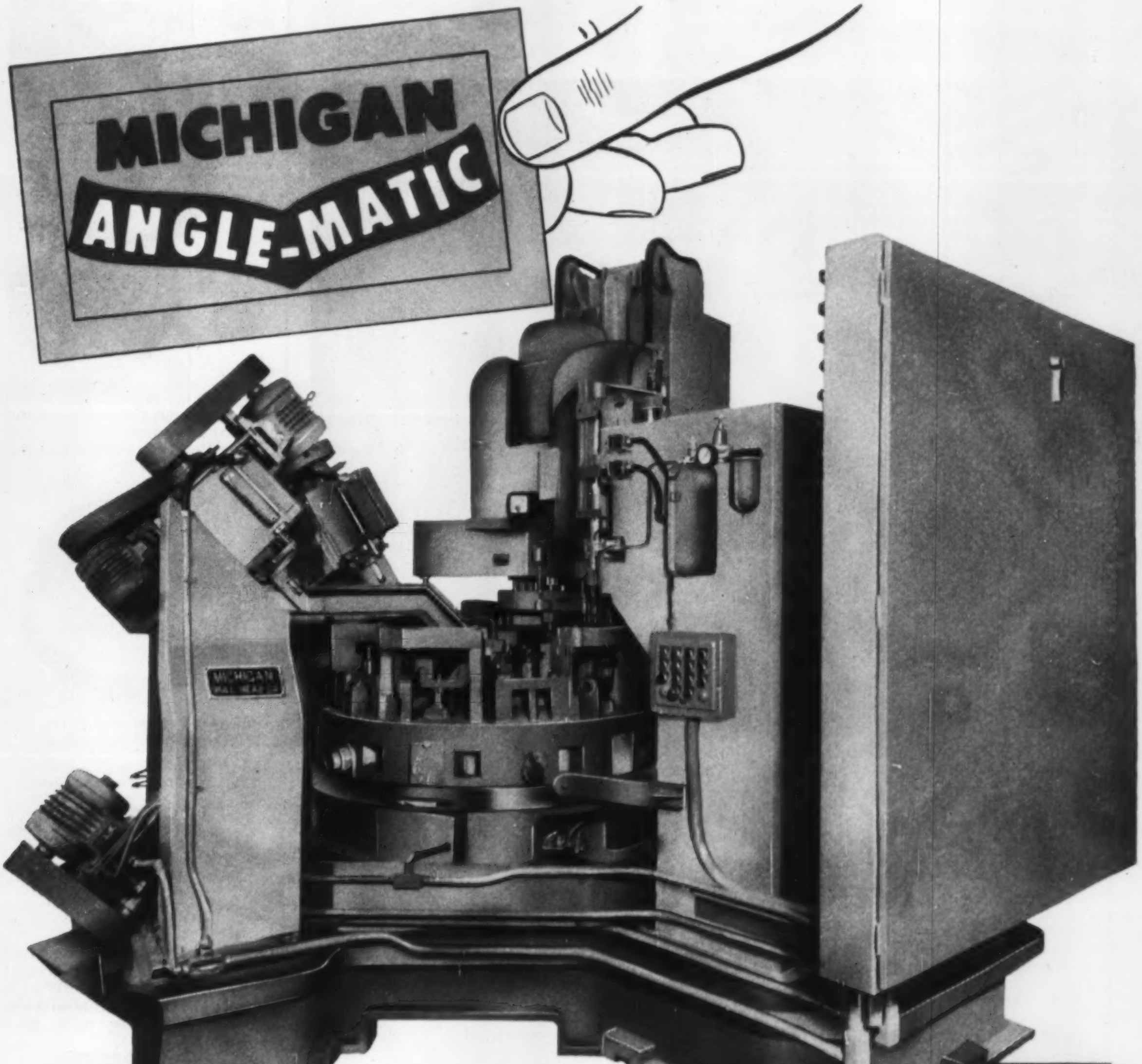
Westinghouse Life-Line Gearmotors have both motor and gears designed as an integral unit. As a result, there's a major saving in space because all belts, chains and pulleys can be eliminated. This means no alignment problems. Since integral design lessens the number of wearing parts, over-all maintenance is cut to a minimum.

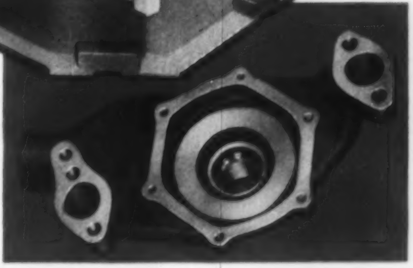
With split-case gearmotors, there's no need to allow large work areas for removal or dismantling—all servicing can be done with the gearmotor "on the job". Split-case construction permits the gear cover to be removed in minutes and makes all working parts readily accessible. Any servicing, therefore, becomes a simple, speedy operation.

Taper-hardened gear teeth, thorough lubrication and industry-tested Life-Line Motors are but a few of the features which assure long, dependable performance from Westinghouse Gearmotors.

Your local Westinghouse Representative will gladly furnish you with additional information. Call him at any time or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. *Trade-Mark J-07322

YOU CAN BE SURE...IF IT'S
Westinghouse


MICHIGAN
ANGLE-MATIC
MICHIGAN DRILL HEAD CO.



PRODUCES...

120 WATER PUMP BODIES per hour

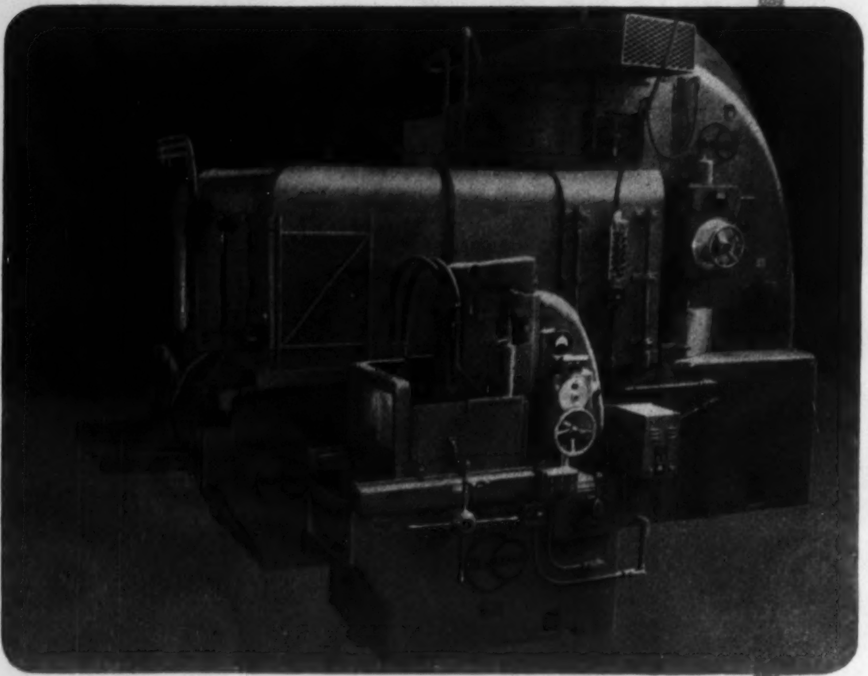
DRILLS • CHAMFERS • SPOT FACES • BORES • TAPS
WATER PUMP BODIES FOR V-8 ENGINES

For Faster, More Economical Production

We also invite your inquiries as to our line of tapping units, and index tables, both manual and automatic.

Michigan DRILL HEAD CO. Detroit 34, Michigan

engineers and manufacturers of production machines and drilling equipment



V-488

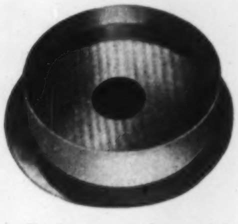
Please give us a chance!

We *know* we can do *your* flat surface jobs. We've done them all — tiny watch parts . . . steel plates 7 feet across corners . . . copper and ceramics . . . *perfectly*. Just give us the correct wheel . . . (Blanchard wheels are preferable).

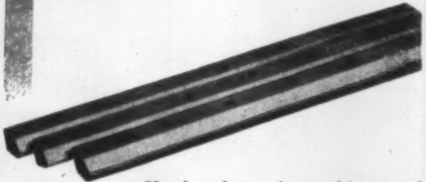
Blanchards regularly grind surfaces flat to within 2 to 4 light bands, parallel to less than .0001″, with dimension tolerance of .0002″ and surface finish to better than 3 micro-inches.

Honest, we Blanchards (15 models) work fast and inexpensively — whether the job requires precision grinding or rapid removal of stock. Give us a chance to prove we're the best investment you ever made.

Tiny watch gears, pinions and ruby bearings — flat and parallel — to a dimension tolerance of .0002″.



To 3 micro-inches and flat within *one* light band.



Hardened steel machine tool ways, 2½″ x 3½″ x 50″, ground on 6 sides, flat within .001″ with surface finish of 5 micro-inches — *5 times faster than other methods!*

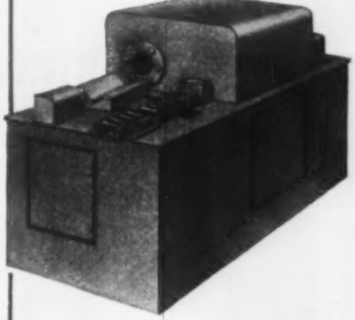
Die plates, 7′ across corners and perhaps 2′ thick, holding flatness to .001″.

Send for free copies of "Work Done on the Blanchard" (fourth edition), and "The Art of Blanchard Surface Grinding".

PUT IT ON THE BLANCHARD

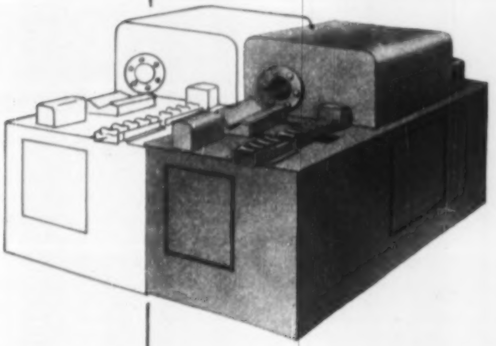
THE BLANCHARD MACHINE COMPANY **64 STATE ST., CAMBRIDGE 39, MASS., U. S. A.**

Magnethermic brass billet heaters



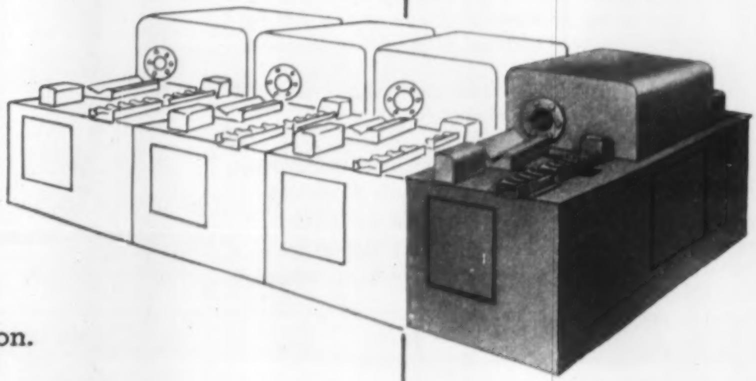
STANDARD UNITS

Available in 300 and 500 K. W. Single coil designs.



ANY COMBINATION

Two or more can be installed together for increased capacity.



AS PRODUCTION WARRANTS

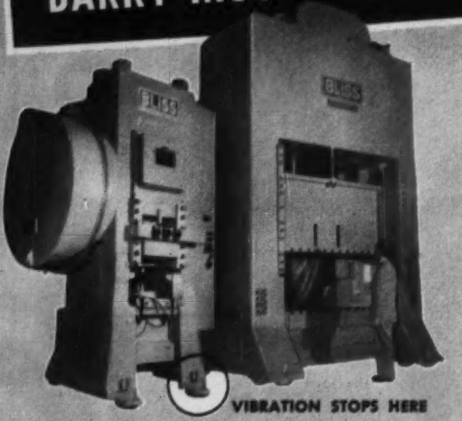
Additional units may be added without disrupting the original installation.

300 K. W. **500 K. W.**

Standardized units designed by Magnethermic. Provide a flexible low-cost method of installing induction heaters on your brass or copper extrusion press. Available in two sizes, 300 and 500 K. W. Multiples of these units may be grouped up to obtain any desired capacity. Install one now, add one later.

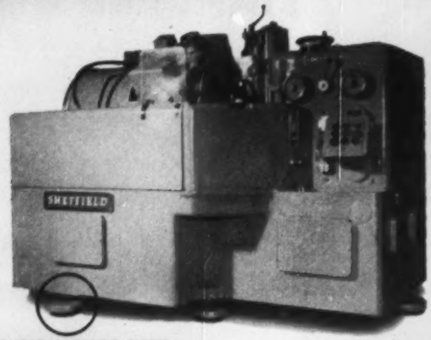
INDUCTION HEATING
MAGNETHERMIC
corporation
3990 SIMON ROAD YOUNGSTOWN 7, OHIO
60 THROUGH 10,000 CYCLES

42 MANUFACTURERS *at the Tool Show* PROVED BARRY MOUNTS BOOST PRODUCTION — CUT COSTS



VIBRATION STOPS HERE

400-TON BLISS PRESS "FLOATS" ON BARRY MOUNTS. With no special foundation, or floor preparation, this knuckle-joint press weighing 26,500 lbs. was installed, leveled, and ready for demonstration in less than 30 minutes. The saving in cost of installation for this and two other giant presses far exceeded the cost of the Barry Leveling Mounts used — with the plus value of freedom from frame stresses met in lagged down installations.



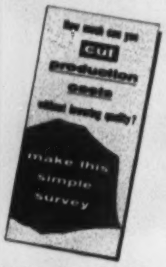
VIBRATION STOPS HERE

CONSISTENT HIGH-QUALITY PRODUCTION to extremely close tolerances was demonstrated in the Sheffield precision gear grinder exhibit without interference from the pounding of huge heavy-impact presses in adjacent show spaces. With Barry Leveling Mounts isolating the grinders from floor-borne shocks, one operator said, "This machine is performing excellently. I'm getting *no* rejects".

YOU CAN GET MORE and BETTER PRODUCTION

and lower costs in YOUR plant — even if you have problems as tough as any met by machine-tool builders at the Chicago show.

This FREE check-chart shows proved cures for such dollar-eaters as:



- Frozen machine layouts
- Too much downtime
- Machine duplication
- In-line maintenance
- Building-borne vibration
- Slow machine speeds
- Idle space
- Excessive noise

Write for free copy of Barry Plant Survey Chart SA-755 and Product Bulletin 546.

•

SOLD THROUGH INDUSTRIAL DISTRIBUTORS

•

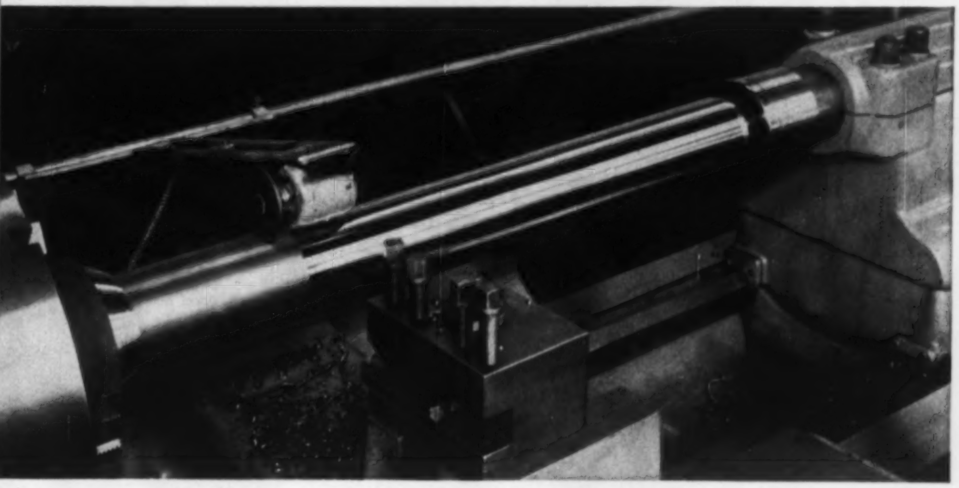
Barry's expansion program offers engineering opportunities at all levels in all departments.

VIBRATION STOPS HERE

HIGH-SPEED, POWER SHEAR PRODUCTION by Famco was made easy to display by use of Barry Mounts. Installation and leveling was a matter of a few minutes. Then, with day after day operation at up to 85 strokes per minute, the shear did not "walk" . . . while vibration-sensitive lathes and grinders in nearby booths were reported unaffected by the high-speed, heavy impact.

BARRY CONTROLS incorporated **926 Pleasant St. Watertown 72, Mass.**

Normal speed for finishing this AISI 1045 shaft with carbide is 500 sfpm. (See tachometer above.) Only 7.4 cubic inches are removed in 2 minutes with .010" feed, 1/16" depth of cut.



With Carboloy Cemented Oxide, speed increased to 2000 sfpm, and 29.6 cubic inches were removed in the same time, under identical cutting conditions.

Limited offering available January 1 . . .

FINISH STEEL AT SPEEDS UP TO 7500 SFPM WITH NEW CARBOLOY CEMENTED OXIDE TOOLS

Carboloy® Cemented Oxide is an entirely new kind of cutting material, specially developed for steel finishing at speeds ranging from 300 to 7500 sfpm.

To date, Cemented Oxide tools have been used to cut steel with Brinell readings up to 300. Results have included more metal removed per minute, with finishes superior to those possible with carbide or HSS.

Tip stays cool

Performance evaluations at the Carboloy machinability laboratory and in customer plants prove Cemented Oxide cuts cleanly, resists edge wear and cratering. Even at extremely high operating speeds, the tip remains so cool it can be touched immediately after the cut.

Preliminary reports show Cemented Oxide can also improve efficiency of relatively low-speed equipment. Because this material provides longer tool life at higher speeds, output increases and cutting time is reduced.

Takes up where carbides leave off

Carboloy Cemented Oxide is not a typical ceramic or cermet. It is stronger and more resistant to chipping than typical ceramics. Four years in development, Cemented Oxide takes up where carbides leave off on high-speed steel finishing.

To ~~aid~~ full-scale commercial evaluation of Carboloy Cemented Oxide, a limited number of sizes and shapes will be available January 1. For the preliminary technical bulletin on Carboloy Cemented Oxide, write today.

CARBOLOY

DEPARTMENT OF GENERAL ELECTRIC COMPANY
11141 E. 8 Mile Street, Detroit 32, Michigan

"Carboloy" is the trademark for products of the Carboloy Department of General Electric Company

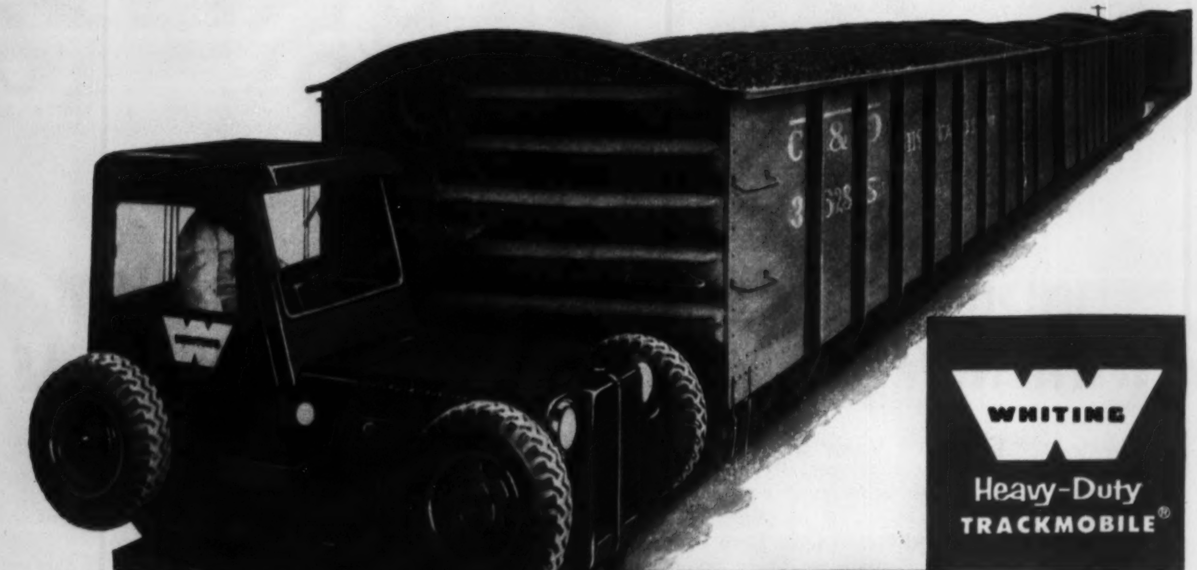
Look at what's new in low-cost freight car moving!

WHITING Presents the New Heavy-Duty TRACKMOBILE®

Here's power and ruggedness for moving freight cars at *low* cost! The new Heavy-Duty Trackmobile makes *tough* jobs *easy.* Clogged sidings, bottlenecks and heavy traffic present no problem. Drive the Trackmobile on road wheels to the track—transfer to rail wheels—couple—then pull those heavily loaded cars! The Trackmobile speeds up switching, spotting, hauling . . . keeps shipping operations on the move . . . provides *new* flexibility. Designed for *continuous* 24-hour service—day or night—rain or shine. Look to the new Heavy-Duty Trackmobile *now* as a way to make important cost reductions!

WHITING CORPORATION
15643 Lothrop Avenue, Harvey, Illinois
Manufacturers of CRANES • TRAMBEAM • FOUNDRY, RAILROAD AND CHEMICAL EQUIPMENT

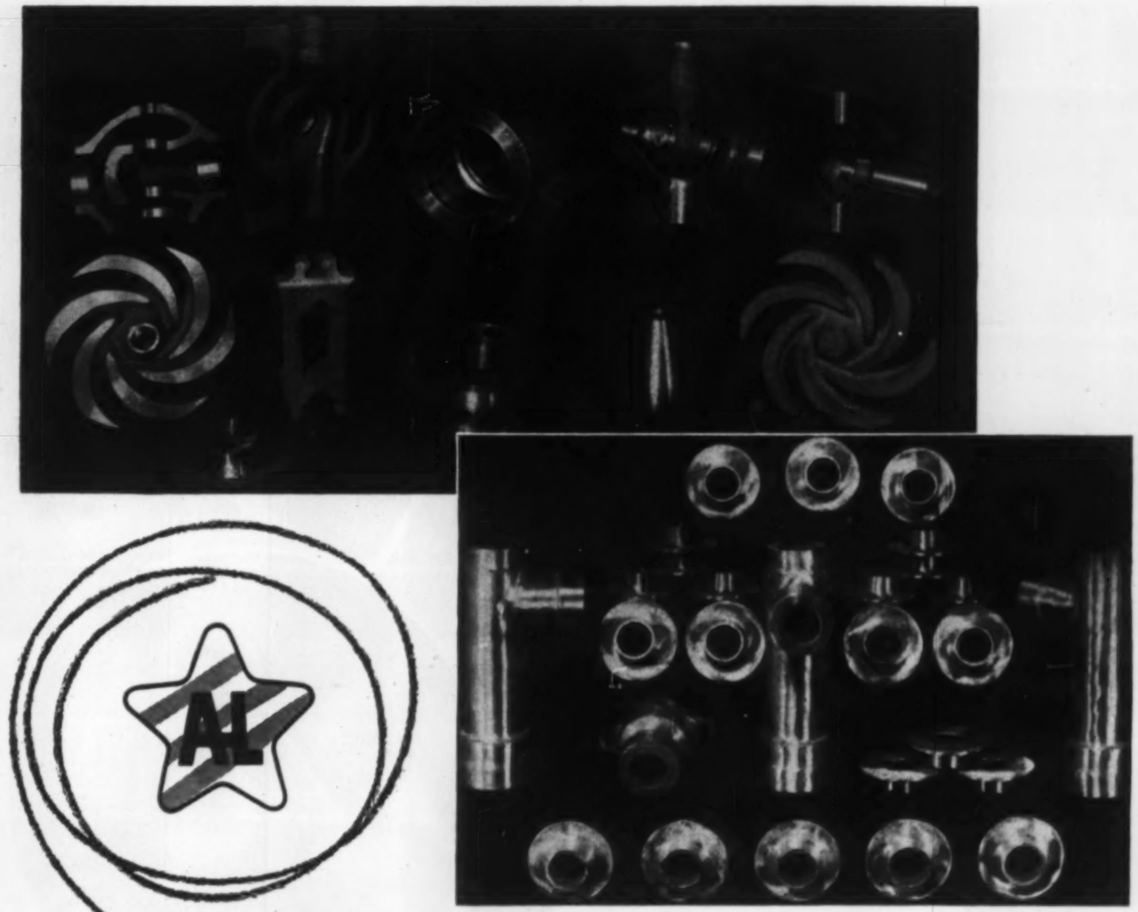
The Trackmobile principle of operation has been proved in hundreds of applications in scores of industries.



WHITING
Heavy-Duty
TRACKMOBILE®

Write today for the new Heavy-Duty Trackmobile Bulletin T-115. Give us an idea of your individual freight car handling problems, and we'll be glad to suggest ways the Trackmobile can save you both time and money.

Transfers from road to track, or back again, in less than two minutes! On track it pulls railroad cars . . . on road it pulls skids, carts or portable equipment.



This is the mark that means clean, sound Stainless Castings all the time

ALLEGHENY METAL
CASTINGS

Write for your copy: "ALLEGHENY METAL CASTINGS"

32 pages of valuable and complete data on stainless castings: analyses, properties, technical data on handling and heat treatment, typical applications, how to order, etc.

ADDRESS DEPT. S-72

Every stainless casting produced by our Buffalo Foundry carries the familiar "AL Star" trademark, cast into the steel. That means it's *Allegheny Metal,* the time-tested stainless steel—a pioneer that has successfully answered thousands of difficult corrosion and heat resisting problems.

It not only means experience in stainless casting applications, but in maintained high quality, too. The A-L Buffalo Foundry is a pioneer in both the vertical-centrifugal and static methods of casting stainless steel. You can depend upon Allegheny Metal Stainless Castings to be strong, clean-surfaced, sound-structured and easy-machining . . . fully in accord with the service conditions and with your requirements for delivery.

Let our stainless foundry specialists quote on *your* problem jobs—any shape casting or any size, up to thousands of pounds. ● *Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.*

W&D 5007 B

For Stainless Steel in ALL Forms—call

Allegheny Ludlum

AL STAINLESS STEEL ®

Warehouse stocks carried by all Ryerson Steel plants

Sigma welding has made the repair of these large pump impellers faster and more economical. Finished welds are a sound, homogeneous bond.

Sigma Welding Saves $5,000 per unit

Speeds repair of world's second largest pumps . . .

During operation, giant 20 ton manganese bronze pump impellers like this one, suffer cracks ranging in size from small sand inclusions, to cuts over a foot long. By using sigma welding, it is now possible to make high quality, on the spot repairs without disassembling the units — this results in an immediate savings of 5,000 dollars per pump.

Shown above is a typical repair operation on one of the 22,000 hp. electric motor driven pumps. This crack is 11-in. long, 2½-in. wide, and 2-in. deep. The four pegs adjacent to the crack are strain check points. Frequent measurements made of the distance between them determines welding duration and the peening sequence necessary to control distortion which in this operation was less than 0.005 inch. The completed weld made with aluminum bronze wire has an excellent surface appearance and color match.

You can speed production and cut costs in your operations—find out more about sigma welding from your local LINDE representative . . . Start saving now, call him today.

Linde Air Products Company
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
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Linde
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6x19
6x37
8x19
6x7

YOUR WICKWIRE ROPE DISTRIBUTOR SUPPLIES THE ANSWERS TO WIRE ROPE PROBLEMS

One of the best ways to find out "what goes" is to be right on the spot. That's why a Wickwire distributor is a wire rope expert—he practically lives with the industries he supplies with wire rope. He knows his customers' specialized problems from first-hand experience, and is able to give competent practical advice on the best construction—6x19, 6x37, 8x19, etc.—for them to use. And he delivers the type, size and length of wire rope they need directly from his warehouse stocks. They save time . . . storage space . . . paper work.

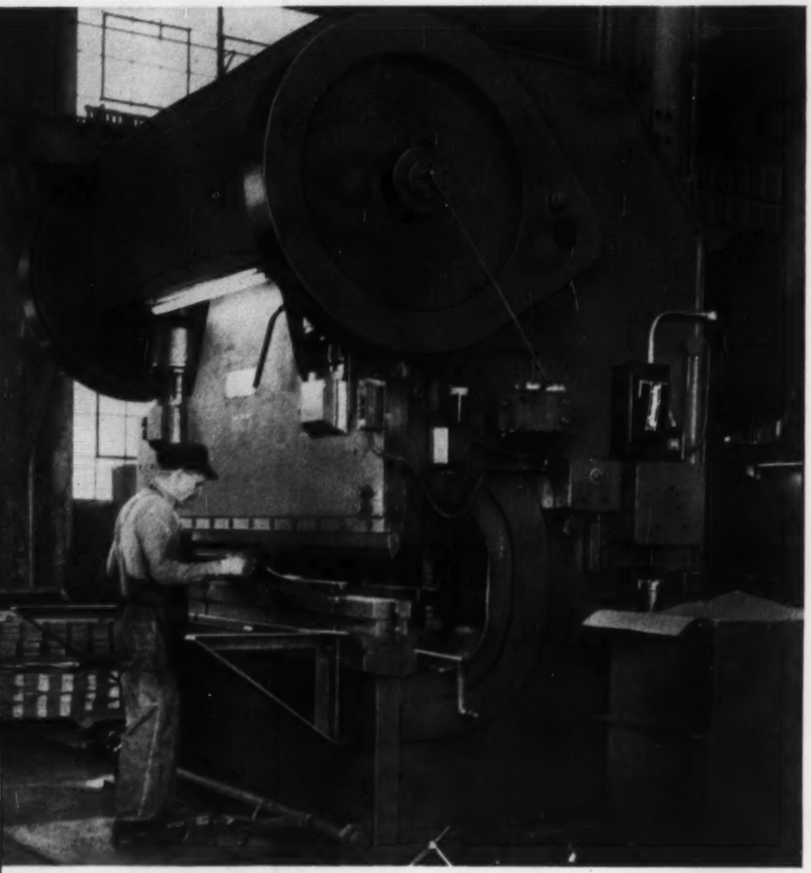
Your Wickwire Rope distributor is a good man to know. He's quality people handling quality products. Buy your wire rope and wire rope slings from him. You'll find that the many valuable services he offers far outweigh any apparent price advantage you might gain by buying direct.

CF&I
WICKWIRE
ROPE
A
CF&I PRODUCT

A PRODUCT OF THE COLORADO FUEL AND IRON CORPORATION

3153

Installed in the Chicago plant in 1948, this 260 ton capacity machine, Model J4½-6, forms the smaller and lighter gauge conveyor panels. Illustrated is a curved section being formed of ⅜" plate to a radius of 8".



CANADA
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STEELWELDS Serve Link-Belt Plants *From Coast-To-Coast*

NINE LINK-BELT Company plants located from California to Pennsylvania, Texas to Ontario, Canada, and in Transvaal, South Africa, have one to six Steelweld Presses and Shears. Nearly every year since 1944 more Steelwelds have been purchased. Slightly over half of the machines are shears.

As a large manufacturer of a wide variety of conveying and processing equipment such as apron, screw, oscillating and overhead chain trolley conveyors, railroad car dumpers, bucket elevators and other handling equipment, Link-Belt plants must shear and form a great amount of steel plate. From experience, Link-Belt has learned that Steelwelds are outstanding for this work.

There are several reasons for this. For instance, the accessibility of controls and ease of making adjustments. The all-around solid construction that permits continuous operation with hairline accuracy. The heavy, well designed machinery which requires minimum maintenance.

Like Link-Belt, when you really get to know Steelweld Bending Presses, you, too, will be elated with their performance.

GET THIS BOOK!

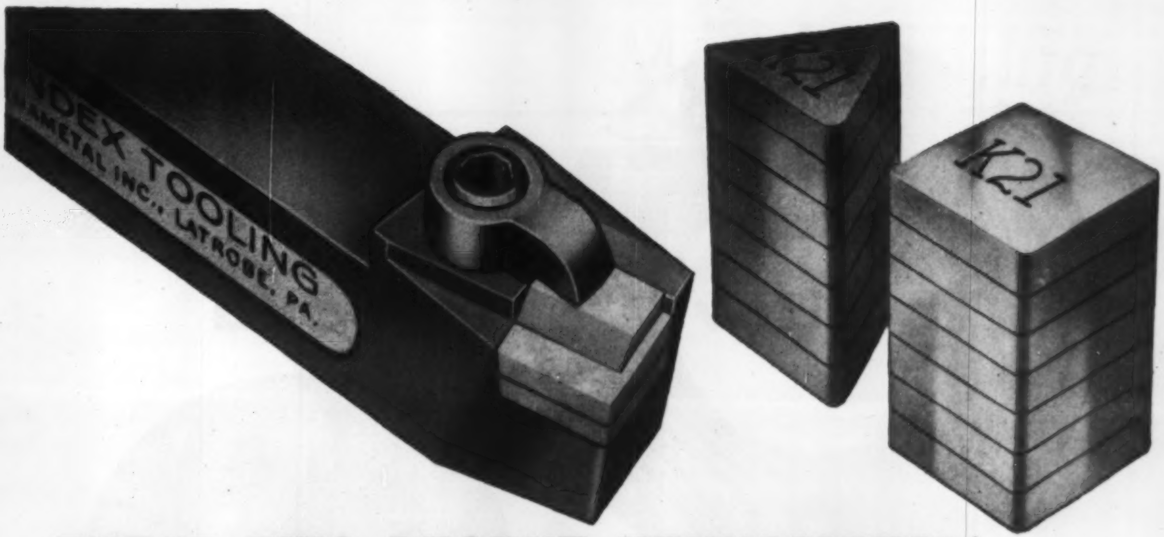
CATALOG No. 2010 gives construction and engineering details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.
7863 EAST 281st STREET, WICKLIFFE, OHIO

STEELWELD

BENDING PRESSES

BRAKING • FORMING • BLANKING • DRAWING • CORRUGATING • PUNCHING



THESE TWO RECENT KENNAMETAL* DEVELOPMENTS HELP TO MEET TODAY'S HIGH-SPEED PRODUCTION NEEDS

The profit advantages of today's high-speed automatic cycling machines for metal cutting are lost when tools wear rapidly—need frequent regrinding—or are cumbersome to index.

Kennametal recently introduced two new developments to help give you continuous machine performance, and to help step up profits in your steel-cutting operations. These developments are Kendex*† Button Tooling and Kennametal Grade K21.

Kendex "turnover" inserts, with replaceable Kennametal shims and new chip control system, double the number of cutting edges, eliminate all regrinding and index in seconds. These features help provide consistent tool performance and hold downtime to a minimum.

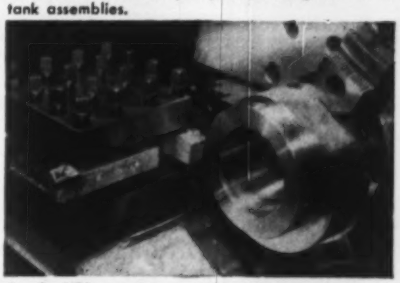
Grade K21 is the General Purpose steel-cutting carbide now outperforming all other medium grades in the carbide industry. Superior performance of K21 is due to exceptionally high edge strength, strong resistance to cratering and superior wear qualities. An extremely versatile grade, K21 can be applied to general steel-cutting, heavy roughing and finishing.

Kendex, in 17 styles and sizes; and K21, in popular blanks and inserts, are immediately available from stock. For their right application on your machining jobs, call a Kennametal Tool Engineer. He works exclusively with Kennametal . . . applying and servicing it. And be sure to ask for reports of Kendex and K21 repeat performances, job after job. KENNAMETAL INC., Latrobe, Pa.

*Registered Trademark †Patent applied for 9403

PROVED BEST—TEST AFTER TEST

Kendex Tooling with "turnover" inserts cuts tool cost from $1.20 to $0.09 per piece, turning SAE 4140 tank assemblies.



Grade K21—on interrupted cutting, roughed and finished 6 times as many pieces as other premium carbide.

Give your machines the tools they deserve . . . the BEST

MINING, METAL AND WOODWORKING TOOLS

WEAR AND HEAT-RESISTANT PARTS

INDUSTRY AND
KENNAMETAL
. . . Partners in Progress

ABRASION, CORROSION-RESISTANT PARTS

PERCUSSION AND IMPACT PARTS

hollow or solid

a steel tube or bar for every purpose

TUBING: SEAMLESS AND WELDED

Whatever your tubing requirement—whatever kind and quantity you need—you can get quick delivery of a quality product with a single call to Ryerson.

That's because Ryerson stocks are the nation's largest, including more types and sizes, more tonnage, than any other source. And Ryerson service facilities are unequalled, too.

Hack saws, band saws and equipment for production lathe cutting and chamfering assure quick service on your orders. In addition, a staff of tubing specialists puts years of experience to work on your problems of tubing selection and fabrication. So call Ryerson for everything in tubing and tubing service.

In stock: Cold drawn and hot rolled seamless mechanical tubing, hot and cold rolled welded tubing, hydraulic and cylinder tubing, structural tubing, etc.

COLD FINISHED BARS

Careful handling, accurate cutting, vigilant inspection—these are just three of many ways in which Ryerson assures you of the highest quality in cold finished bars.

Stored in temperature-controlled rooms, spark-tested to guard against mixed steels, Ryerson cold finished bar stocks include rounds, squares, hex's, flats—screw steel, accuracy stock, turned, ground and polished shafting, Ledloy for fastest machining—everything you need. And even the hard-to-get intermediate sizes are on hand.

To help you select the best cold finished bar for each application, we have just published a simplified guide showing the comparative strength, cost, machinability, workability, etc. of all commonly used types. Write for your copy and call Ryerson when you need high quality cold finished bars.

RYERSON STEEL

In stock: Bars, structurals, plates, sheets, tubing, alloy and stainless steel, reinforcing bars, machinery & tools, etc.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI • CLEVELAND DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

STEEL

December 5, 1955

Metalworking Outlook

Auto Soft Spots?

It's too early to draw conclusions, but auto sales in the first ten days of November were the lowest for the first third of any month this year. Loose credit, which helped move so many 1955 models, may not aid so much for 1956 cars. Government actions have boosted rates and made money harder to borrow. And lenders don't want to lengthen the repayment period beyond the average 30 months that's current now. The situation is not serious, but you'll want to keep an eye on it.

GM in the Headlines

The General Motors Corp. investigation by the Senate's O'Mahoney committee is drawing a lot of headlines, but it's unlikely that any action will stem from it. Even a former Justice department attorney, Holmes Baldridge, who handled two prosecutions against GM and GMAC, admits that the department was unable to find enough evidence of GMAC "coercion" of GM dealers to justify action as recently as 1952. Then a civil suit rising out of a GM conviction in a criminal action was ended by consent decree.

Bearings: Holding Up Freight Cars

As if the steel shortage weren't enough, freight car output is also being held down because bearings are hard to get. If those scarcities could be licked, carbuilding could double and still not fully meet demand. At the end of October, freight car order backlogs hit 61,954, compared with 12,853 a year earlier.

Shortage in Forging Steel

Gearmakers, drop forgers and many other metalworking firms are being plagued by inability to get carbon and nickel alloy forging steels. Other alloy forging grades are in a little better shape. Says Mondie Forge Co. Inc., Cleveland, about forging steel: "The first quarter looks tough; on the basis of mill allotments, we can work only three days a week."

More Republic Expansion?

Before Republic Steel Corp.'s current $130-million expansion program is finished by 1957, look for the company to announce still another one. The next move probably will be to build a completely new sheet and tin plate plant somewhere in the Great Lakes area. If Republic builds one about the size of the Fairless works, the cost would be around $500 million.

Labor's Unity Day

This is union merger week. The AFL and CIO become one. At a New York meeting that begins today (Dec. 5) the formal step will be taken,

Technical Outlook—p. 121

Market Outlook—p. 173

uniting 10.2 million members of AFL and 5.2 million adherents of CIO. Still independent will be 57 other unions national in scope, claiming membership of 1.8 to 2 million. Question: Will the pressure increase on them to join the AFL-CIO orbit? Another 2000 to 2500 local unaffiliated unions also exist. They have an estimated membership of about 5 million.

Northwest's Industrial Magnet

Pacific Northwest power resources are attracting new industry. Some 50 projects, either new or expansions of present facilities, are under consideration. Helping the trend is the federal policy of encouraging private power development where possible. Some seven out of ten voters in Stevens county, Washington, approved sale of county utility facilities to the private Washington Water Power Co. The result indicates public approval of the federal power policy.

More Pentagon Planning

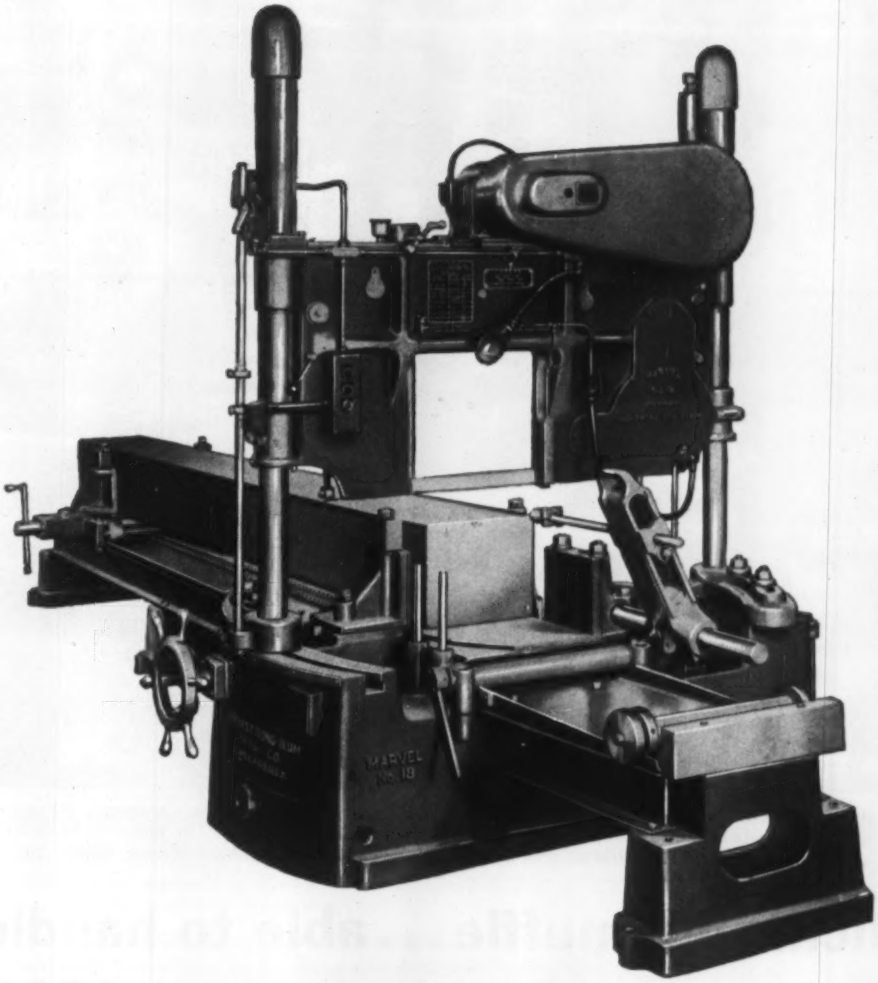
The Defense department is considering the compilation of a classified preferential planning list of the most critical items that would require advance facilities allocation and preparation of production schedules in times of emergency. Components would be included in such a list to make sure that adequate planning is done with subcontractors. The purpose of a preferential planning list is to assure planning for the more critical items and to prevent wasting of time by planning officers on items that can be produced easily and bought off the shelf.

Recruiting Starts Early

If you're waiting until spring to begin college graduate recruiting, you'll probably find slim pickings. Courting next June's grads is already in full swing. One University of Michigan Business Administration major gives his record to date: 100 on-campus interviews, eight expense-paid trips for company interviews.

Straws in the Wind

Kaiser Aluminum & Chemical Corp. will buy four extrusion presses from Birdsboro Steel Foundry & Machine Co. for its light press expansion at Halethorpe, Md.; the first unit will be in operation by the second quarter . . . Japan is negotiating with Kaiser Steel Corp. to purchase 100,000 tons of pig iron . . . Algoma Steel Corp. next spring will begin development of an iron ore deposit in the Calabogie, Ont., area . . . Only 1 home in 22 is equipped with mechanical air conditioning, according to a Du Pont study . . . New National Labor Relations Board Chairman Boyd Leedom and Stephen S. Bean, a new member, are middle-of-the-roaders who will be giving NLRB a strong shove in that direction.



No Job too big or too tough . . .

for MARVEL "*Giant*" Hack Saws

These giant MARVEL Hydraulic Hack Saws (No. 18, Capacity 18" x 18"; and No. 24, Capacity 24" x 24") were *basically* designed for rapid and economical cut-off of BIG WORK. They are not merely "conventional" designs "stretched" to big capacity. They are truly designed and built with the ruggedness and rigidity necessary to withstand the rough treatment of sawing big work, even though the work is in the "toughest of the tough" alloys.

They are reliably fulfilling the cut-off requirements in innumerable steel mills, forge shops, structural shops, warehouses, and machine shops, with assured low tool cost and minimum kerf loss of steel.

In addition to cutting-off, they are reducing costs by eliminating further machining operations. Heat treated die blocks are being reclaimed for re-sinking by sawing off the worn face; columns, beams, pipe, and tubing are being sawed to *finished*, square ends, eliminating milling; angular sawing is done conveniently by swinging the upper structure on the base, to any angle up to 45 degrees—*without moving the work.*

Contemplating the modern trend toward ever tougher steels and larger sizes, these are the logical sawing machines to buy, not only for today's needs but for tomorrow's as well.

Write for Catalog

MARVEL *Metal Cutting* **SAWS**
Better Machines—Better Blades

ARMSTRONG-BLUM MFG. CO. 5700 West Bloomingdale Avenue • Chicago 39, U.S.A.

At low heat-hour cost . . . Nichrome muffles give thousands of hours of high temperature service in gas furnaces manufactured by the American Gas Furnaces Company, Elizabeth, N. J., in operation at plant of Shakeproof Div., Illinois Tool Works, Elgin, Ill.

Nichrome muffle . . . able to handle corrosive gas for 5½ years at 1600°F

HANDLING A CORROSIVE MIXTURE of city gas and ammonia, a Nichrome muffle used for heat treating small steel parts completed 36,732 hours of almost uninterrupted service at 1600°F.

But this temperature is no severe test for Nichrome. Even at higher temperatures, under normal heating conditions you'll find little deterioration of this 60% nickel-15% chromium-iron alloy.

Actually, the big story about a Nichrome muffle is its ability to withstand "thermal shock." Shock from repeated alternate heating and cooling. And shock from intermittent charging of cold work.

Naturally, the 60% nickel content in Nichrome produces significant effects. For one thing, it improves load-carrying characteristics at elevated temperatures. Equally important, the nickel addition plays a major role in improving resistance to scaling from common industrial atmospheres.

That's why you find Nichrome muffles, retorts and other heat treating components used extensively for nitriding, for carburizing, for oxidation . . . for handling reducing gases, and for operations involving high temperature fatigue.

If you have a metal problem, we'll be glad to help with our wide practical experience. No matter what your industry, send the details of your difficulty for our suggestions. Write us now.

A typical Nichrome* muffle, produced by Driver-Harris Co., Harrison, N. J. Nichrome muffles of this type weigh from 291 to 2775 lbs., depending on furnace size and function.

*Reg. Trademark of Driver-Harris Co.

INCO TRADE MARK **THE INTERNATIONAL NICKEL COMPANY, INC.** 67 Wall Street
New York 5, N. Y.

December 5, 1955

Building Confidence

Americans plan to pour $44 billion into new construction next year. This tenth consecutive record for building expenditures will bring the postwar volume of new construction to more than $320 billion.

It would be difficult to overestimate what construction has meant to our postwar economy. Contract construction currently is giving employment to 2.7 million workers. That is four times the number employed in all forms of mining. It is nearly three times the employment in the automotive industry. It is nearly twice the number employed in processing food and kindred products. It even exceeds employment in the federal government.

As a consumer of steel and other metals, construction ranks a close second to the automotive industry. Nearly one-sixth of all finished steel shipped last year went for building and contractors' products.

A booming construction industry requires a heavy investment in machinery and equipment. New construction in place means a large market for furnishings, equipment and machinery.

High construction activity and good business go hand in hand. You are unlikely to see any major economic downturn while building activity is up. One reason why the readjustment in 1954 was so mild was the continuing improvement in construction.

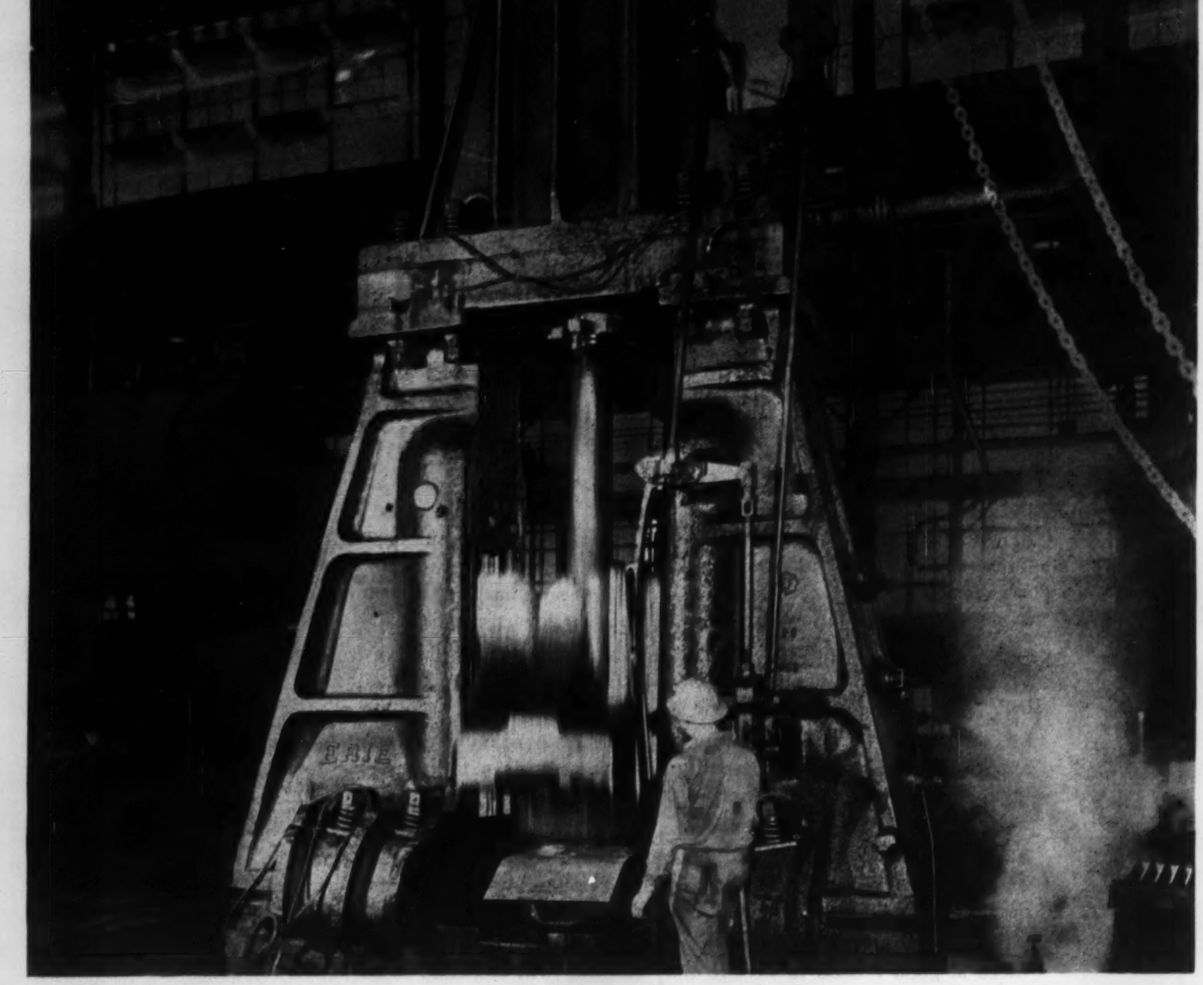
While construction expenditures estimated in this issue are for 1956 only, there is good reason to believe that building will continue to be active for several years to come. Industry is projecting large expansion programs that will require two and three years to complete. Highway and bridge building are a national must to accommodate the ever-increasing automotive traffic. There is a crying need for more schools and hospitals, and they will be built. Railroads, trucklines and airlines are calling for new terminal facilities and for construction by manufacturers producing the rolling stock. Atomic power development is coming up faster than was thought possible a year or two ago.

Add that old reliable of present-day economists—an upsurging population that requires a lot more housing—and you have a bright picture for construction in 1956 and several years thereafter.

Walter J. Campbell

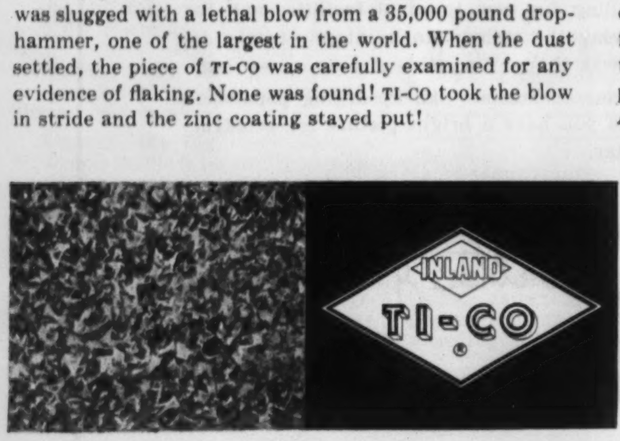
MANAGING EDITOR

35,000-lb. drop-hammer fails to flake Inland TI-CO®!



The ability of Inland's TI-CO galvanized steel to take punishment without flaking of the zinc coating was recently put to the supreme test. A sample sheet of TI-CO was slugged with a lethal blow from a 35,000 pound drop-hammer, one of the largest in the world. When the dust settled, the piece of TI-CO was carefully examined for any evidence of flaking. None was found! TI-CO took the blow in stride and the zinc coating stayed put!

Unlike ordinary galvanized sheets, the protective zinc coating on Inland TI-CO, produced by the patented Sendzimir process, will not crack, flake or peel when stamped, crimped, double-seamed, brake formed or even when formed by spinning. This flexible, uniform coating means that products made with TI-CO are easier and cheaper to produce because re-dipping after forming is eliminated. And they stay serviceable and good-looking longer, too!



It will pay you to specify Inland TI-CO for all your galvanized steel requirements. INLAND TI-CO . . . with the zinc coating that rolls with the punch.

INLAND STEEL COMPANY

38 South Dearborn Street • Chicago 3, Illinois
Sales Offices: Chicago • Milwaukee • St. Paul • Davenport
St. Louis • Kansas City • Indianapolis • Detroit • New York

Strength in Structurals

STRUCTURAL steel fabricators are looking for a substantial increase in shipments next year.

Their backlog of orders by Dec. 31 will be 1.8 million tons, or 50 per cent above the level of Dec. 31, 1954. Bookings of new business this year will reach 3.4 million tons, an increase of 45 per cent over a year ago and the highest since 1929.

Supply Lack—Obtaining an adequate supply of plain steel from the mills is the big problem of fabricators. The shortage of sheet has limited their shipments in the last six months and will continue to be a limiting factor during early 1956.

By mid-1956, new structural capacities will ease the supply situation, Earle V. Grover, president of American Institute of Steel Construction, told members at the association's annual meeting at Boca Raton, Fla., Nov. 28-31.

Future — "By mid-1956," says Mr. Grover, "we will be able to look all our customers in the eye and promise a mutually satisfactory delivery date. Although our industry is still on short rations, the end of our enforced starvation is in sight."

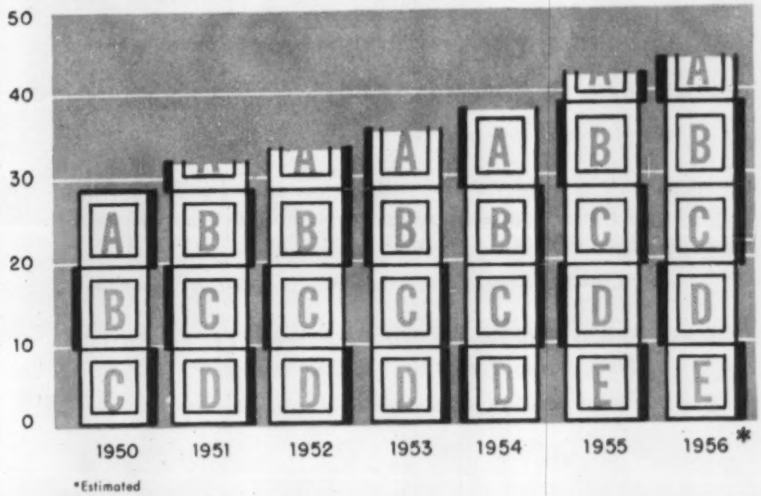
Shipments in 1955 will be about 2.7 million tons, down 8 per cent from 1954 and about equivalent to 1951 and 1952, estimates L. Abbett Post, executive vice president of the institute. The drop is due entirely to the inability of fabricators to get enough plain material.

Prospects Rosy—For the long pull, fabricators see an extended era of good business.

Highways and bridges will produce a large and continuing volume. Industrial expansion, especially in metalworking, will be on the upgrade. Utilities, atomic power plants, rail and truck terminals, schools and hospitals, multiple level parking lots and more suburban shopping centers will provide booming markets for years.

New Construction Activity

(billions of dollars)



In 1956, for the tenth consecutive year, we'll be . . .

Building for Another Record

CONSTRUCTION will be one of the nation's economic frontrunners again in 1956. Outlook: A $44-billion year for new construction, an additional $16 billion for maintenance and repair.

If new construction hits the predicted $44 billion—and it should—it will be 5 per cent higher than the record $42 billion of 1955. That means a record for new construction in every year since World War II. Next year's total will be one and one-half times that of as recent a year as 1950, will be double the 1948 total.

Big Prop—The buoyant effect that booming construction has on the economy is easily seen. The industry ranks a close second to autos as a steel consumer. It directly employs more than 2.7 million workers, double the number in the primary metals industry. It's estimated that construction accounts for one out of every seven dollars of gross national product. And $1 million spent on highways means use of 420 to 450 tons of steel.

Plans like these will keep the boom going: The auto industry has earmarked $1.8 billion for expansion in 1956. Steel will add 5 million tons of capacity next year at a cost of about $500 million. Much of that money will go for building.

Comeback—A year ago, economists were worried about industrial construction. Now it's looked to as one of the big upward forces in the building industry. Expansions like those of the auto and steel industry will push industry's outlays to $2.8 billion next year, 17 per cent more than 1955's $2.4 billion, estimate the Commerce and Labor departments.

Other heavy construction will have a big share in the construction industry's record breaking year. Commercial building (warehouses, offices, stores) will be up 14 per cent to $3.5 billion. Privately owned public utilities will spend about $4.5 billion, the same as this year. Increases by railroads (18 per cent) and telephone and telegraph companies (11 per

Looking Ahead with Optimism . . .

The construction industry, now rounding out its greatest year of activity, looks forward to further expansion in 1956. The year's total, including maintenance as well as new construction, may well exceed $60 billion.

H. E. Foreman, managing director, Associated General Contractors of America

1956 will break all previous records in new road construction.

National Electrical Contractors Association

We expect 1956 to begin at a rather slow rate, but the second half will be better; total housing starts shouldn't be off more than 50,000 to 100,000.

Harry H. Steidle, manager, Prefabricated Home Manufacturers Association

Over-all housing may be off, but we expect to build 120,000 homes in 1956, compared with 100,000 this year.

J. N. Robertson, president, American Road Builders Association

Preliminary estimates indicate electrical contractors should do a $4.5-to-$5-billion business next year; 1955 will be about a $4-billion year.

National Association of Home Builders of the United States

cent) will offset declines in oil and gas and electrical industry spending.

More Gains—Public construction will be up about 10 per cent, including gains of 12 per cent for highways, 14 per cent for military projects. Power and other facilities of the St. Lawrence Seaway development also account for a goodly share of the gain.

Spending for new housing accounts for over one-third of total new construction. Nonfarm housing starts may be down as much as 10 per cent from this year's 1.3 million, but that's still a lot of housing. And the houses that are built in 1956 will be bigger, better. That means more dollars spent per house; so dollar volume will be off only about 3 per cent from 1955.

Possibility — If the more optimistic estimates of next year's housing hold up, dollar volume could even better the record $14.8 billion spent this year.

Most estimators of housing starts say volume depends considerably on the availability of mortgage credit. But they're figuring the government will loosen credit strings if housing volume shows any signs of a prolonged slump. They're pretty sure politicians won't allow housing to fall off much in an election year, especially since present prosperity will be one of the major campaign themes.

Costs—Price hikes may account for as much as half of the dollar volume increase between 1955 and 1956. Builders are expecting both material and labor costs to go up but feel spirited competition will prevent them from passing on the full increase. Estimates are for a 1 to 3 per cent climb in the cost of finished construction.

Opinion is divided on raw material supplies. Steel and cement are the chief concerns. The most optimistic say supplies will be "adequate," while the majority expect to have some trouble, but not much more than this year. An indication of the strength of the construction market: Building firms say: "We could do 25 per cent more business if we could get enough steel."

Still Growing — That serves to point up the fact that construction will continue as a strong bulwark in the economy for years to come. Steel industry growth will average about 4 million tons a year for the next 15 years. Aluminum capacity will double in that time. The auto industry has billions of dollars worth of expansion planned in just the next couple of years. Promising gains are evident in electronics and atomic energy.

It all means building.

In addition, a huge highway program is a necessity and will pour billions into construction over the next decade. Housing starts are expected to run over 1 million a year through 1960, then rack up phenomenal gains as the baby boom that began in the 1940s begins to grow up.

Just Starting—St. Lawrence Seaway activity is building up. Much port improvement is necessary to take care of a swelling volume of trade coming over that route. To supply the growing number of homes and factories, the utility industry will have to continue making huge outlays for plant and equipment.

The construction boom is just getting started.

• *Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*

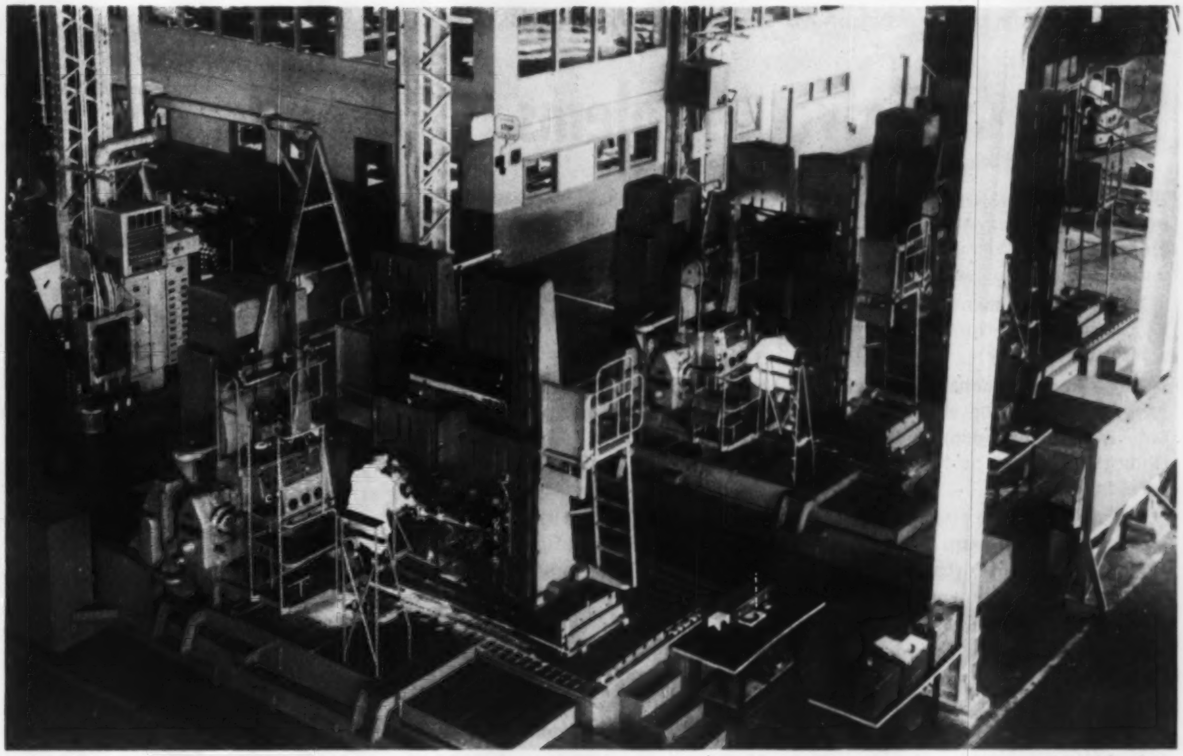
Alan Wood Expands

Steelmaking capacity will be increased 19 per cent at Alan Wood Steel Co., Conshohocken, Pa.

The program includes a new, open-hearth furnace (together with an improved cooling water supply system for the open-hearth department), cold-rolled annealing facilities and a cold-rolled temper mill. About $14 million will be spent in the next two years.

The open-hearth furnace (to be completed next summer) will bring the company's rated capacity to 800,000 tons a year—it's now 625,000 tons, but operations have been at a better than 675,000 tons a year rate the last eight months.

The first phase of Alan Wood's postwar expansion and improvement was completed last year. Cost: $45 million for a 23 per cent increase in steelmaking capacity, construction of hot and cold strip mills and modernization of blooming and plate mills and other equipment.



Kaiser Mfg. Corp.

Profile millers like this may get the nod as . . .

Air Force Shifts Tool Plans

THE ARMED SERVICES' machine tool purchase program has a fresh start.

The program originally called for $100 million to be spent on machine tools for stockpile. Of that amount, $84 million had been sliced off for the Air Force. The Army and Navy got the rest.

Economy Slash—To save money, the Administration decided to scrap the program. Defense officials also claimed that the tools would be obsolete by the time they might be needed.

By then the Air Force had obligated some $15 million of its cut and was negotiating for much of the rest.

Revisions—Now the Administration has a new deal—less money and a program to buy tools for immediate use. The Air Force has been cut to $70 million, which includes the $15 million it has spent. This leaves it $55 million to buy new machine tools for active duty.

Most of the machines will go into planned production of aircraft, including airframes and engines. Other tools to be bought are: Skin millers, profile millers, knee and bed-type millers, vertical turret lathes and some horizontal boring machines.

Because of the cutback, some presses will not be purchased, and orders for a lot of skin millers will be canceled.

Joker — Most of the contracts will be let shortly—provided contractors don't change the terms already negotiated. If some of the machine tool builders want to up the ante on costs, the Air Force may have to look elsewhere.

Meanwhile, the Army and Navy are moving more slowly. No details of what they expect to buy have been announced.

U.S. Steel Boosts Some Prices

American Steel & Wire Division, U. S. Steel Corp., revised prices on carbon cold-rolled strip, effective as of midnight Nov. 30. Changes are being made in extras for size, straightening and cutting, in addition to a few changes in quality and chemical extras. Base prices on cold-rolled strip, in carbons 0.26 and over, are being advanced by $2 a ton. Packaging extras are being revised up and down.

U. S. Steel's Columbia-Geneva Steel Division and Tennessee Coal & Iron Division, announced certain changes in extras on carbon, high-strength and electrical sheet and strip products. Changes in packaging extras result in an over-all reduction in charges for that service. Dimensional extras for lighter gages of hot-rolled sheet are increased in amounts ranging from $1 to $3 per ton. The extra for special killed quality is increased $2 per ton for hot-rolled sheet and strip and $4 a ton for other sheets.

Hotpoint gets all management levels together when . . .

Keymen Solve Problems

WITH A BIG expansion program under way after World War II, Hotpoint Co., Chicago, faced three management problems:

1. Its management team had to be motivated to think in terms of a larger company.

2. A management development program had to be set up to provide qualified personnel for positions that opened as the expansion targets were met.

3. An effective two-way communications program was necessary to accomplish the expansion and still maintain profit levels.

Plan—Hotpoint top management formed its Keymen group. Philosophy of the program: Bring all managers—from foremen on up—together and expose them to all company problems, goals and achievements. They'll work more closely as an effective management team.

Hotpoint's Keymen represent operating management, middle management and executive management in all phases of company activities. Membership is gained only through recommendation of an individual by his department head and approval by the Keymen advisory board.

Heart of Program — Robert Westra, manager of employee relations, emphasizes: "Just telling them they're part of the management team isn't enough. They've got to feel it through active participation."

How's it accomplished? Through discussion meetings—both in small groups concerned with one particular operation and in general meetings of all 400 Keymen. Not only do Keymen learn about one another's jobs and departments, but they are expected to make suggestions for improvement in these other activities.

Take the management conference held in June. A three-day program was set up in a Chicago hotel, so that every Keyman had some specific task. The purpose was to discuss steps which could be taken to meet an outlined two-year goal and the long-range, ten-year goal.

Formula—All meetings, large or small, hinge on pyramiding or structuring ideas from every Keyman to top management. Each day 120 Keymen, eight to a table, met. The program was scheduled to discuss three major topics—products, production, people. Each topic had three areas—product quality, sales and cost of sales; production materials, cost and automation; personnel relationships, development and compensation.

Time Limit—One hour was allotted to each topic. Each of the three subtopics was assigned to five tables. Each table was responsible for discussion and written conclusions on its assigned topic. On the final day, nine representatives (one from each major topic each day) formed a panel to discuss the written conclusions.

Result — Over 3000 suggestions and criticisms were submitted. Screened and boiled down to omit duplication, nearly 150 usable conclusions resulted. Final step: President J. C. Sharp gave product general managers three months to answer or put the conclusions into action.

Normally, only two or three general meetings are held each year. While results from them are substantial, officials state that more can be accomplished in the small meetings called to tackle a specific problem. "It's here that Keymen spot problems which fall directly into their laps. Then they stick their necks out on how they'll take action."

Results Published—As each Keyman group conducts a discussion meeting, a report on the topics covered, highlights and conclusions are printed and sent to all Keymen to keep them current on activities throughout the company.

Another communications feature is the Keymen management letter. In this letter (Kiplinger style), company activities are outlined, business reports given and trouble areas discussed. The idea is that Keymen should be looking for possible corrective measures in their own realm of activities.

Local Leaders—Keymen also are expected and encouraged to be leaders in their community life. A high percentage are active in service clubs like the Junior Chamber of Commerce, Junior Achievement, Community Fund and other pro-

Like knights of old, Hotpoint Keymen meet at the roundtable to discuss ideas

grams. Also being developed is a Keymen speakers bureau which not only promotes Hotpoint goodwill, but helps develop the Keyman as an individual.

Hotpoint estimates the cost of its Keymen program is about $100 per man annually. "No amount of money could give us the esprit de corps in our management that this program delivers," says Mr. Westra. "It's been a major factor in Hotpoint's growth in the past ten years to one of the nation's top appliance makers."

GE Builds Better Lamps

General Electric Co. has revamped its lamp bulbs to increase light output 6 to 15 per cent without using more electricity.

The greatest improvement is in industrial-size lamps (750 and 1000 watts). The 750-watt bulb will produce an average of 21.6 light units for each watt of electricity consumed, compared with the 18.9 lumens it now puts out. GE says the large bulbs are immediately available.

Vernet C. Kauffman, manager of GE's engineering department, explains the increased light output comes from:

Improving the tungsten filament, altering mount structure so the filament is set lengthwise in the bulb and substituting double coiled filaments for singly coiled ones in lamps of 300 watts and up. Double or "coiled" coil filaments formerly were used only in household bulbs.

GE reports: "This is the greatest single improvement in incandescent light bulbs in 42 years."

Jorgensen Buys Baker Steel

Earle M. Jorgensen Co., Los Angeles, purchased Baker Steel & Tube Co., that city, distributor of steel and aluminum tubing.

Bryant Builds in Indianapolis

Carrier Corp., Syracuse, N. Y., is constructing an administration and engineering research building at 2020 Montcalm St., Indianapolis, as the national headquarters of its Bryant Division, producer of home heating and cooling equipment, water heaters and boilers.

Accounts receivable may provide the answer if you . . .

Need More Working Capital?

THIS year, some $6 billion in new working capital will flow into industry from accounts receivable financing.

This device is one of several ways in which metalworking can turn headaches into assets. (Another, field warehousing, was covered in STEEL, Mar. 21, p. 74.) Here's how accounts receivable financing works:

Cases — An agricultural implement and machinery manufacturer was doing a business of $1 million a year, and had $200,000 tied up in accounts receivable. If he could raise $140,000 additional capital, he could handle a $1.6 million annual volume. Short-term borrowing was not the answer, since he needed a permanent increase in working capital. He didn't want partners, and flotation of a security issue was prohibitive.

A commercial finance company —Standard Factors Corp., New York—was assigned all the manufacturers' accounts receivable. It then advanced payment of $180,000 to the manufacturer (90 per cent of the face value of the security). The manufacturer had his $140,000, with $40,000 to spare. He continues to bill his customers and collect his invoices, and he has built volume up to his forecast. As fast as fresh sales are made, the commercial finance company will make further cash advances if required.

Costs — On a simple interest basis, accounts receivable financing is usually more expensive than bank credit. But dollar for dollar, it may often cost less. Since accounts receivable companies charge interest on a daily basis, if the manufacturer doesn't need the cash for the full month, he comes out ahead as opposed to a 30-day bank loan.

Republic Adds Culvert Plant

Republic Steel Corp. will build a plant near Harrisburg, Pa., to produce riveted, corrugated-metal drainage products. The Culvert Division of Republic Steel will operate it, says Ernest R. Johnson, vice president of operations.

Expected to be in operation next spring, the unit will have facilities for the production of plain galvanized and asphalt coated drainage structures. Initial employment will be less than 100. Republic will acquire nearly 6 acres of land for possible expansion.

Engines: Power for Industry

Industrial units come into their own as work horses on the farm, in the factory and for construction. Reason: Rising need for portable energy

SHORTLY after World War II surplus engines came into use for irrigation purposes. As demand mounted and the supply of war surplus engines dwindled, a Texas Plymouth-Dodge dealer contacted the Marine & Industrial Engine Division of Chrysler Corp. Its engineers developed a special engine capable of delivering an average of 1250 gallons of water a minute from wells hundreds of feet under the ground. In the succeeding ten years, Texans have bought more than 27,000 Chrysler irrigation engines, which currently account for 25 per cent of the division's production.

That's only one example of the growing field for industrial engines. The list includes portable welding equipment, fruit sprayers, transit concrete mixers, petroleum pipeline gathering pumps and oil well pumps. In fact, just about any portable power application you can name finds industrial engines on the job. Though companies like Continental, Hercules, LeRoy, Detroit Diesel, Caterpillar and others have been in the picture since prewar days, there seems to be common agreement that the market today is many times the prewar size.

War Influence—A major factor was the war itself. Lift trucks, cranes and shovels soaked up industrial engines in plants while the military used them in such vehicles as aircraft towing tractors and self-contained jet engine starters. Meanwhile, a trend toward more specialized equipment, such as motorized combines and corn pickers, was starting on the farms.

The result has been a sharp growth in industrial engine sales since the end of the war. Companies like Ford, which entered the field in 1947, have found the trend line continuing up. Unfortunately, statistics on growth of the market are hard to come by. A major factor is the lack of uniformity on what is an industrial engine. To some, 1-horsepower jobs, such as those found on lawnmowers, qualify. Others figure multicylinder units only should be counted.

Developments — On the trend line, however, there is agreement, and the manufacturers are doing their bit to help the upward climb. Accessories like torque converters, hour meters, power takeoffs and special carburetors for operation on LP gas or natural gas help adapt the engines for their various duties. Chrysler figures about 360 distinct engine model combinations can be supplied. And Chrysler sales are up about 21.9 per cent in the first nine months of 1955 over the like period of 1954.

One company shortly will announce the establishment of franchised dealers, but one source estimates that about 75 per cent of sales are to manufacturers of equipment. They install the industrial engine in their products, which range from fruit sprayers to lift trucks.

Work Horse — Auto companies like Ford and Chrysler can use many basic components interchangeably with passenger car engines. But special manifolds, carburetors, sodium-cooled valves and other parts may be added. There's a direct analogy between race horses and work horses in the passenger car and industrial engine field.

And somewhat analogous, too, is the fact that while the race horses get the glory, these work horses are doing plenty behind the scenes.

New Restrictions on WOCs

President Eisenhower has put new restrictions on WOCs.

The executive order aims at reducing the opportunity any consultant might have to aid companies in which he has an interest.

It stems from an amendment to the Defense Production Act which deals with "conflict of interest" regulations for those persons serving U. S. without compensation.

The order:

Limits the function of consultants to advising government officials. They are not allowed to make recommendations.

Prohibits nonsalaried experts from making recommendations concerning any business in which they or their private employer might have even an indirect interest.

Requires the employing govern-

CHRYSLER
CHRYSLER
CHRYSLER
CHRYSLER

The auto companies, such as Chrysler, move deeper into field ment agency to tell specifically why it cannot hire a full-time, salaried consultant.

Asks each WOC appointee to file a financial statement and business history in the *Federal Register*. It must include any private affiliations the man has had 60 days prior to his appointment. WOCs also must file statements every six months concerning any changes in their business status.

Merger Matters

Antitrust chief says he'd try to speed court decision on proposed Bethlehem-Youngstown marriage

OFFICIALS OF Youngstown Sheet & Tube Co. and Bethlehem Steel Corp. have another helpful hint on their proposed merger.

Stanley Barnes, Department of Justice antitrust chief, recently declared that he will try to speed up a court decision on the legality of the merger if and when the two firms decide to try it.

Suit Threatened—Attorney General Herbert Brownell already has stated that the Justice department will bring immediate suit against the companies if they attempt to join forces.

Both companies fear that a legal test of the Clayton Act amendment (under which Mr. Brownell believes the merger is illegal) would take six to ten years. In that time executive personnel and economic conditions might change, leaving the expansion program of both firms stymied.

Short Timer—But Mr. Barnes estimated that an antitrust trial could be concluded in about three months—after the companies file an answer to the charge. He indicated he probably would file the case in federal district court in Pittsburgh or Cleveland.

Legal observers have pointed out that even if it were possible to get a district trial that quickly, it might take more months for the judge to render a decision and years before all appeals were exhausted. After that, some stockholders also might file suit.

The two steel firms have been trying to get a three-man federal court to hear the case. They feel this would speed a decision.

Inland Steel Co.

Steel Strapping Wraps It Up

MAKERS of steel strapping are enjoying hefty sales this year, and they think 1956 holds promise for continued gains.

Heavier demand from the record-breaking steel industry has been a major factor in the increased business. Strapping operations approached 100 per cent of capacity in much of 1955, but throughout the latter part of the year the steel shortage has been reducing output.

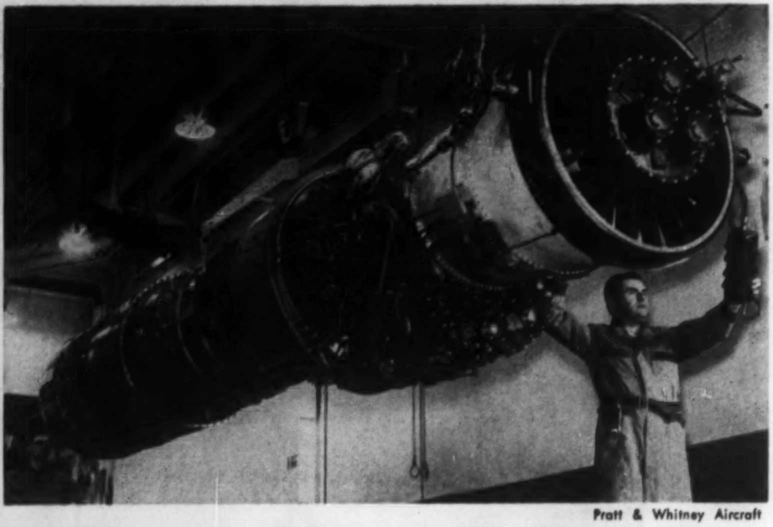
Good Business—About 15 companies are in the strapping industry. Some set production records this year, topping previous marks as much as 46 per cent. Since 1954, it's estimated that the industry has shared in a business gain which averages between 10 and 15 per cent.

Less than half the companies produce or process their own strapping. The bulk of it is flat strip or round wire, both of low-carbon analysis. There is increasing use of cold-rolled, high-carbon, heat-treated flat strapping in larger sizes. Its use grows out of the trend toward larger and heavier packages for shipment.

The Trend—A few firms which distribute round wire strapping have been showing interest in an oval wire and have developed tools for its application.

The steel industry is the biggest consumer of strapping and is followed by such industries as nonferrous metals, automotive, agricultural and heavy machinery, lumber, paper, chemicals, textiles, etc.

Many firms within the last year or so have introduced powered strapping machines. The sale of tools and equipment for applying strapping is on the increase. But, most of the apparatus is leased.



Pratt & Whitney Aircraft

Bigger jet engines, one spur to Defense department's . . .

Search for New Alloys

INDUSTRY has its work cut out to keep pace with a growing need for new and better high temperature alloys.

Complicating the already knotty problem: 1. Bigger, hotter jet engines and power plant steam turbines requiring greater amounts of such alloys. 2. The probability that critical materials needed to produce them (nickel, chromium, cobalt among others) will become scarcer than they are.

Supply Lags—G. A. Tinker, deputy assistant defense secretary for applications engineering, says new discoveries, improvements in methods of extraction and development of substitutes are lagging growing demand for the materials, particularly high temperature alloys.

"One saving feature in the situation" is pointed to by Dr. J. B. Macauley, deputy assistant defense secretary (research and development).

Flexibility—He says: Experience during and since the Korean War indicates that supply of at least some scarce metals used for high temperature alloys is more flexible than was supposed.

Columbium, for example, was at the top of the list in 1952 as our most scarce metal—in terms of mobilization demand in relation to supply. Tight restrictions were placed on its use; a large price incentive was offered to increase production.

Double Benefit—Results: 1. Use of columbium in jet engine metals greatly diminished; it was found that it could be almost eliminated, if necessary, without adverse effect on the engines. 2. The bonus price resulted in the discovery of big columbium deposits. Now the metal is in oversupply.

Tungsten is another metal that was short in 1952. Aided by bonus prices, it is in oversupply.

Progress—Ways to stretch tight supplies, says Lt. Gen. C. S. Irvine, deputy chief of the Air Staff (Material), are to cut back on scrap losses and to develop substitutes.

Some progress is being made:

1. Precision forging offers promising savings in scrap and fabrication costs. Savings up to 50 per cent in materials have been obtained by using heavy press forgings rather than the conventional hog out methods of fabrication.

2. Cold forming techniques, including flow turning, with steel have allowed considerable savings in some rocket and jet engine units.

3. Much progress has been made in developing aircraft quality castings. It's expected that selected components redesigned as castings will achieve a weight reduction of 10 per cent, eliminate many costly machining operations and allow wider choice of aircraft structural materials.

Improvements—Use of substitute materials like titanium and protective coatings (including ceramics) have helped bring about some reductions in the use of critical materials even in the face of higher thrusts and temperatures.

General Irvine points out that in about four years columbium requirements for Air Force engines have been reduced an average of over 50 per cent; tungsten, about 50 per cent; cobalt, about 50 per cent; chromium, about 5 per cent; nickel, 35 per cent.

New Trick — One of the more spectacular developments in jet engine fabricating techniques is roll forging of turbine blades, particularly long titanium blades in newer engines.

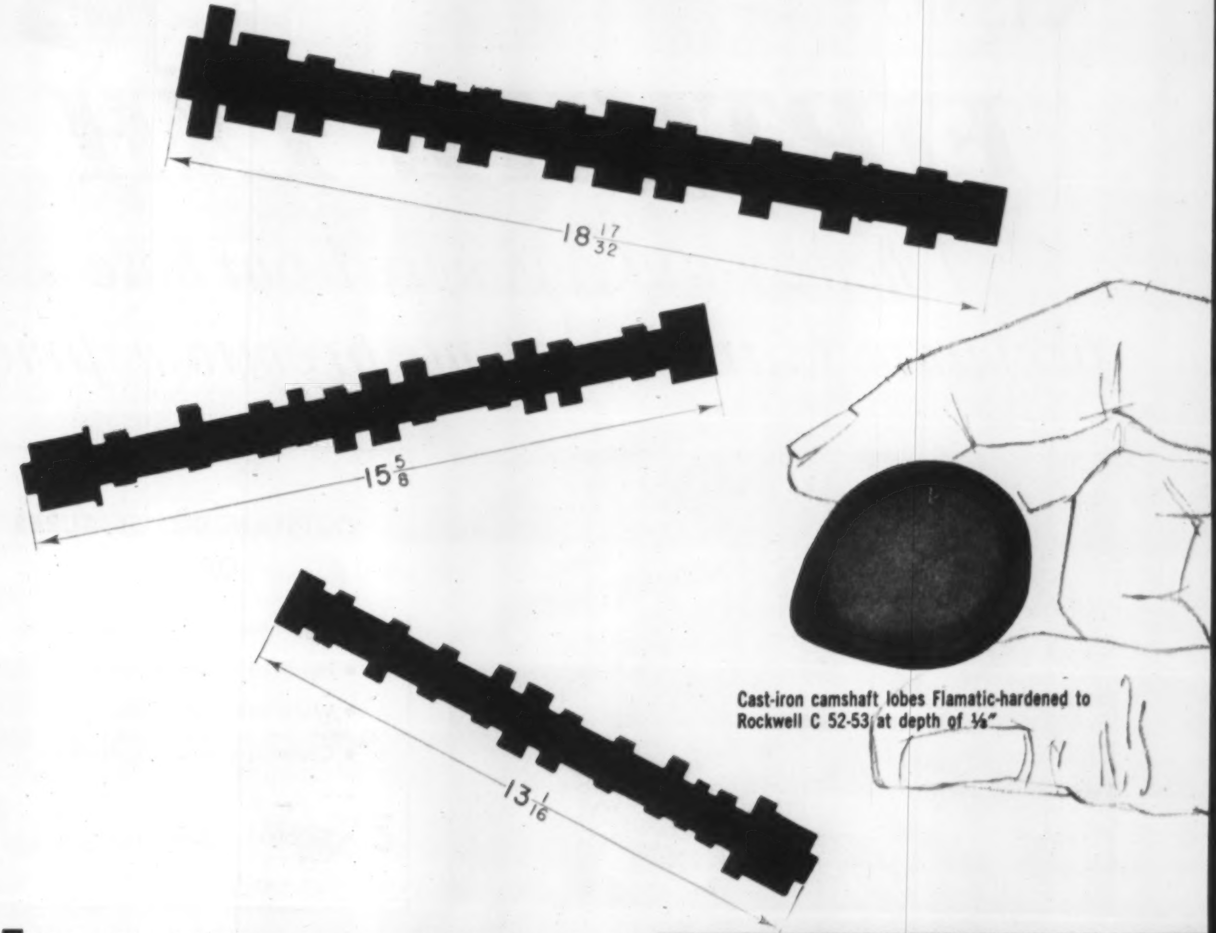
We expect, the general says, to produce items to final finish and tolerances without grinding or machining. The technique indicates big savings in machining time and costs and a reduction in chip losses.

With continued development, techniques in precision forging, flash welding and fusion welding hold promise for the future of engines.

Here and There

Internal Revenue service will hold public hearings Dec. 19-20 on proposed depreciation rules revisions (they deal with useful life, method of computing depreciation, etc.). . . Rear Adm. H. G. Rickover suggests a way industry might relieve the technician shortage: Industry (at its own expense) would supply scientists and engineers to teach in high schools and universities for one-year periods. The cost, he says, will be more than repaid. More and better trained students would be available.

1 flamatic hardens 3 different camshafts



Cast-iron camshaft lobes Flamatic-hardened to Rockwell C 52-53 at depth of ⅛"

THE drawings above show the three camshafts that a large automotive manufacturer asked Flamatic to harden selectively on a single machine. The close-up at the right shows how Flamatic flame hardening solved the problem through simple, ingenious tooling. The machine achieves high production, yet set-up changes take less than 15 minutes. The operator positions the water-cooled shield, sets the selector-switch for the proper flame head, and adjusts the work-holding fixture. The cycle is then automatic except for loading.

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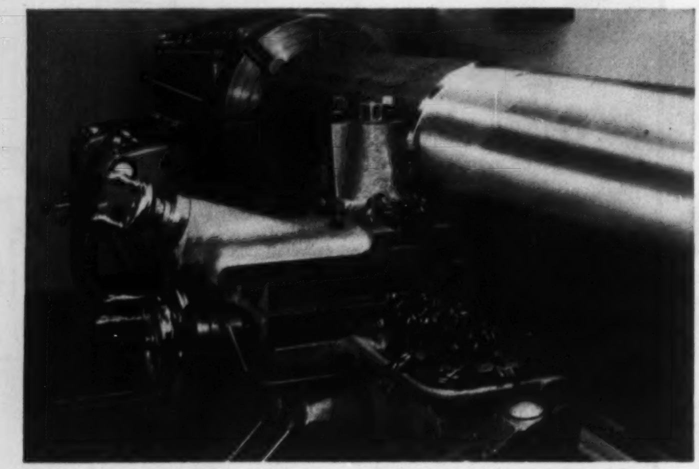

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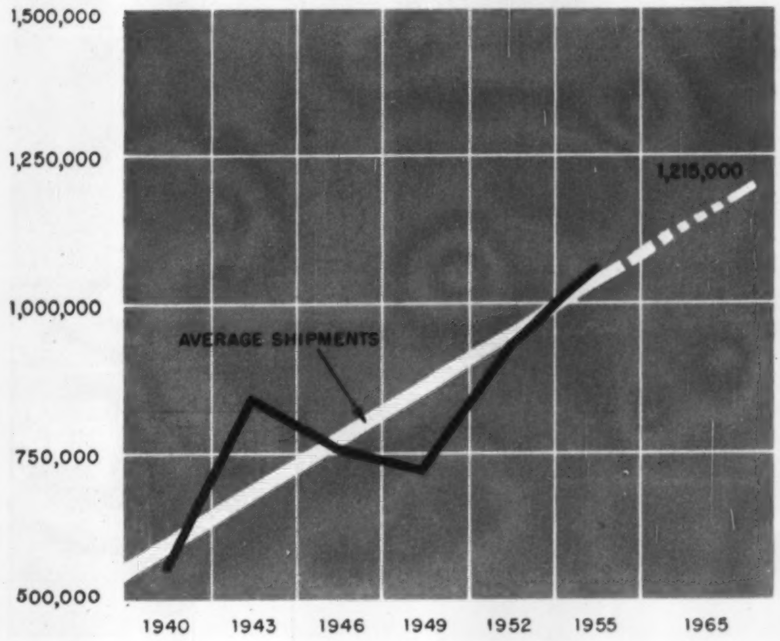


Malleable Iron Castings

Net ton shipments for selected years

1965 estimated by STEEL
Trend line computed by STEEL's Market Research Dept.

Autos and new technology boost output as . . .

Malleable Nears Record

MALLEABLE foundries are working on a record year, but "the industry is in trouble when orders drop," a Cleveland foundryman believes. "It can't operate at 70 per cent of capacity and still make a profit as the steel industry did in 1954."

Material and labor costs are up, and have prompted price increases (ranging from 2 to 10 per cent) this year. Most of the increases (average, about 8 per cent) came in July and August.

Malleable founders still feel that their profits are not adequate. One midwestern operator predicts another upward adjustment will be made in six months.

Inevitable—There is a trend toward larger foundries and an accompanying reduction in the number of malleable shops.

Gunite Foundries Corp., Rockford, Ill., quit malleable production after 91 years in the business. It is concentrating on gray iron and steel castings. D. P. Forbes, president, says: "The (malleable) business was unprofitable 90 per cent of the time."

Volume—In the first nine months of this year malleable founders produced 814,683 tons of castings. At this rate, shipments in 1955 will hit 1,090,000 tons, passing 1951's all-time high of 1,085,241 tons. Model change-overs in the auto industry may pare down totals about 15,000 tons.

Sunny Side — Unfilled orders (123,473 tons in August) are at their highest in two years. Many jobbing shops have backlogs of two to four months.

Buyers of castings are not loading up with inventory. Orders are on the basis of need. The shortage of steel is one reason. Purchasing agents see no point in having more castings than steel on hand.

Inventories are near the 1953 level. In 1954, as one foundryman put it, buyers tried to operate without any inventory at all.

Looking Ahead—The first half of next year should see no letup of the present pace. Sales, if they don't match this year's, will come close—within 5 per cent. A lot depends on the malleable founders' chief customer, the automotive industry.

The Future—Expansion in the consuming industries — including autos, trucks, railroads, farm implements, pipe fittings and plumbing parts—will call for about 1,215,000 tons of malleable castings in 1965. Two developments in the foundry industry will help.

Pearlitic malleable jumped from 27,401 tons in 1945 to 84,548 tons last year. This year's production will be about 170,000 tons, estimates the Malleable Founders' Society, Cleveland. Outlook for next year: 200,000 or more tons. Cal C. Chambers, president, Texas Foundries Inc., Lufkin, Tex., says: "We feel that a potential of 250,000 to 500,000 tons per year exists."

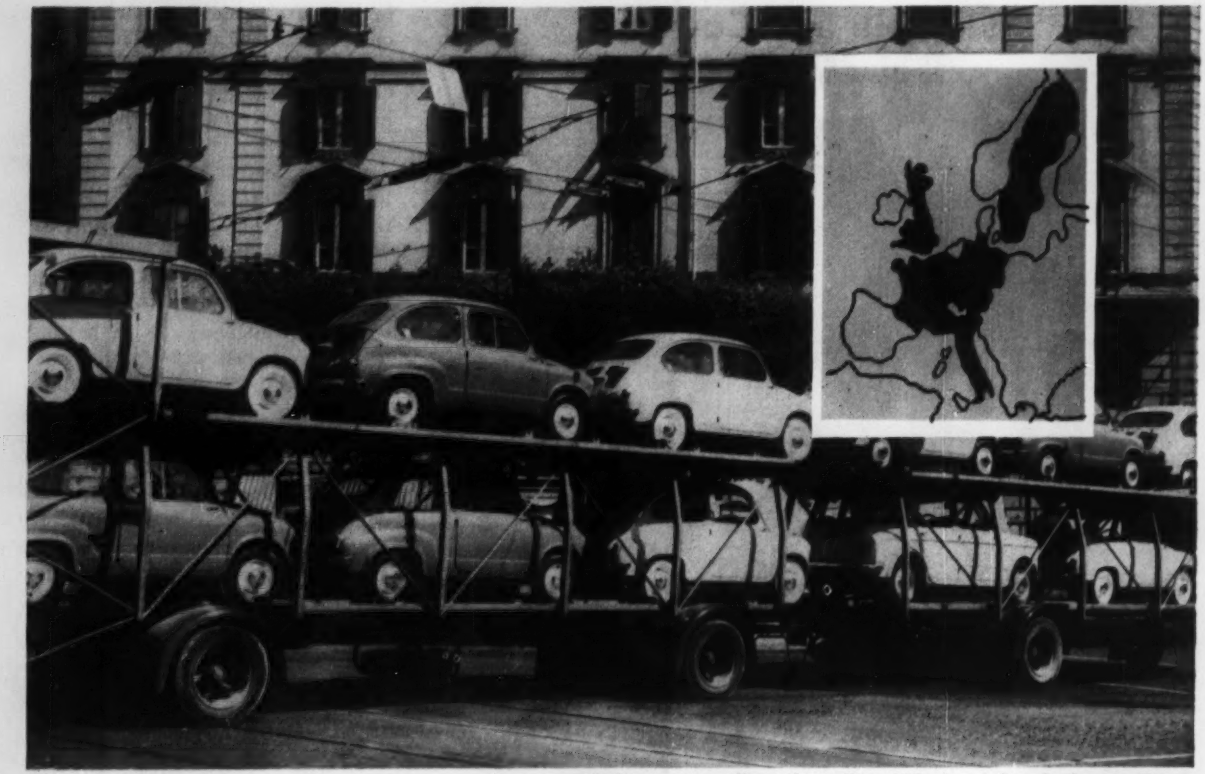
Shell molding is just getting started in the malleable industry. Link-Belt Co.'s malleable foundry in Indianapolis makes 180 molds an hour. This year will see the introduction of automotive crankshafts made of a shell molded pearlitic malleable.

Westinghouse Orders Higher

Westinghouse Electric Corp. looks for sales of $1.6 billion in 1956.

That's about what the company expected to make this year, according to George Main, treasurer, but the current strike upset its plans.

Orders so far this year are 10 per cent ahead of last year's, with defense orders down 9 or 10 per cent. Heavy apparatus bookings are running 25 per cent above 1954's. Consumer goods orders show a 10 per cent gain.



NEA

Italian autos roll as these Fiat 600s head for dealers in Rome

Boom in Europe—

Italy . . .

IN BOTH America and Italy, gross national product this year will be up 6 per cent from 1954. Italy's GNP in 1955 will be $20.9 billion. In America, steel production will be up 31 per cent since 1954; in Italy, 39 per cent. Italy produces 6.4 million tons of steel.

Leaders — Metalworking industries have sparked the advance. Steel capacity is being expanded and modernized with U. S. money and know-how. The government-controlled Finsider group has the latest continuous equipment, including a 6-stand, hot-strip mill, a cold mill and a galvanizing line. A new, Ferrostan, electrolytic tin plate line is on order.

Large offshore procurement programs are another form of U. S. aid to Italy. Not only do they boost the economy, but they also help lever communists out of the labor unions. No U. S. orders are let to companies with communist unions.

Costs—Italy is trying to expand steel exports, but prices are 15 per cent above world levels. However, Dalmine S. A., a Finsider affiliate, exports about 40 per cent of its tubular products output, some to the U. S. and Canada. It has warehouses in Los Angeles, Houston, New Orleans and Edmonton, Alta.

Italy's participation in the European Steel and Coal Community has contributed to lower steel prices—benefiting home consumers but posing real problems for the less efficient steel producers. By 1958, when ECSC members will establish free markets, they will have to reduce operating costs substantially to stay in business.

Discovery of a huge, high-pressure gas field at the foot of the Alps has given a big lift to industry in the Genoa-Turin-Milan triangle. It's even being used for open-hearth fuel. In Sicily and on the Adriatic coast in the south, discovery of high-grade oil (with the help of Gulf Oil Co.) will aid fuel-hungry Italy.

Development — Boosted by concerted efforts to cut production costs, oil and natural gas industries are making continued gains. A network of gas lines is spreading across the industrial north. In its wake—increased consumer demand for gas appliances.

Gas equipment makers are expanding as fast as possible. New plants are mushrooming. North of Milan, 300,000 sq ft of production space are being tailored to turn out water heaters, stoves, air conditioners, refrigerators and meters for the domestic market by next year. The only limits on the speed of this expansion are strict import quotas on machine tools; deliveries are extended up to two years. The purchasing power of the Italian consumer, especially low in the depressed south, is the only limit on its size.

Answers—As long as Italy must import much of her production equipment, it's unlikely that her balance-of-payment problem will be completely solved. During 1955, her deficit has increased by about $960 million. But Italian metalworking products can be exported to competitive markets. Because of the labor factor and advanced design, Italian business machines have made a dent in the American market.

To rebuild depressed areas, Italians are relying on programs like the Cassa del Mezzogiorno, a vast public works scheme partly financed by American aid. The Cassa's annual budget is equivalent to $175 million.

Despite the built-in economic problems, however, the immediate outlook is for continuing gains. There is a new air of independence and confidence in Italian business, manifested, for instance, in Fiat's contract for the Westinghouse atomic generating plant.

Sweden . . .

HOW far should you clamp down on inflation? Here, we're still not sure. Sweden was in the same spot six months ago. She found an answer.

Sweden's boom started at the beginning of 1954. Last January, when Swedish wallets were fattened by a big wage hike, the situation began to get out of hand. By early spring, consumers were on a spending spree. Though investing at breakneck speed to boost production in line with demand, manufacturers were falling behind.

Squeeze — The Swedish government clamped down during the second quarter. Heavy taxes were put on automobiles. Since the war, Sweden's car count has jumped from 1 for every 70 persons to 1 for every 10. Aimed at reducing business exuberance were new taxes on investment and corporate earnings. Results: The boom is tamed, but not killed.

Manufacturing employment will be up 15 per cent from 1954's. In metalworking, employment will be up 6 per cent, and there'll be a 3-per-cent productivity gain due to increased mechanization. Volvo Co., which makes most of Sweden's cars, trucks and busses, has upped output to 60,000 units a year. In spite of heavy tax penalties, domestic auto registrations should equal 1954's record.

Balance—Sweden's exports also gained. Through August, value had gone from $266 million to $282 million, compared with last year. The increase is due largely to metalworking. More than 90 per cent of Swedish ore is exported, and mines have been producing at capacity through the year. Output is up 10 per cent from 1954's.

Shipyards, too, have been working at capacity. Tonnage will be up 15 per cent from 1954 for an all-time high.

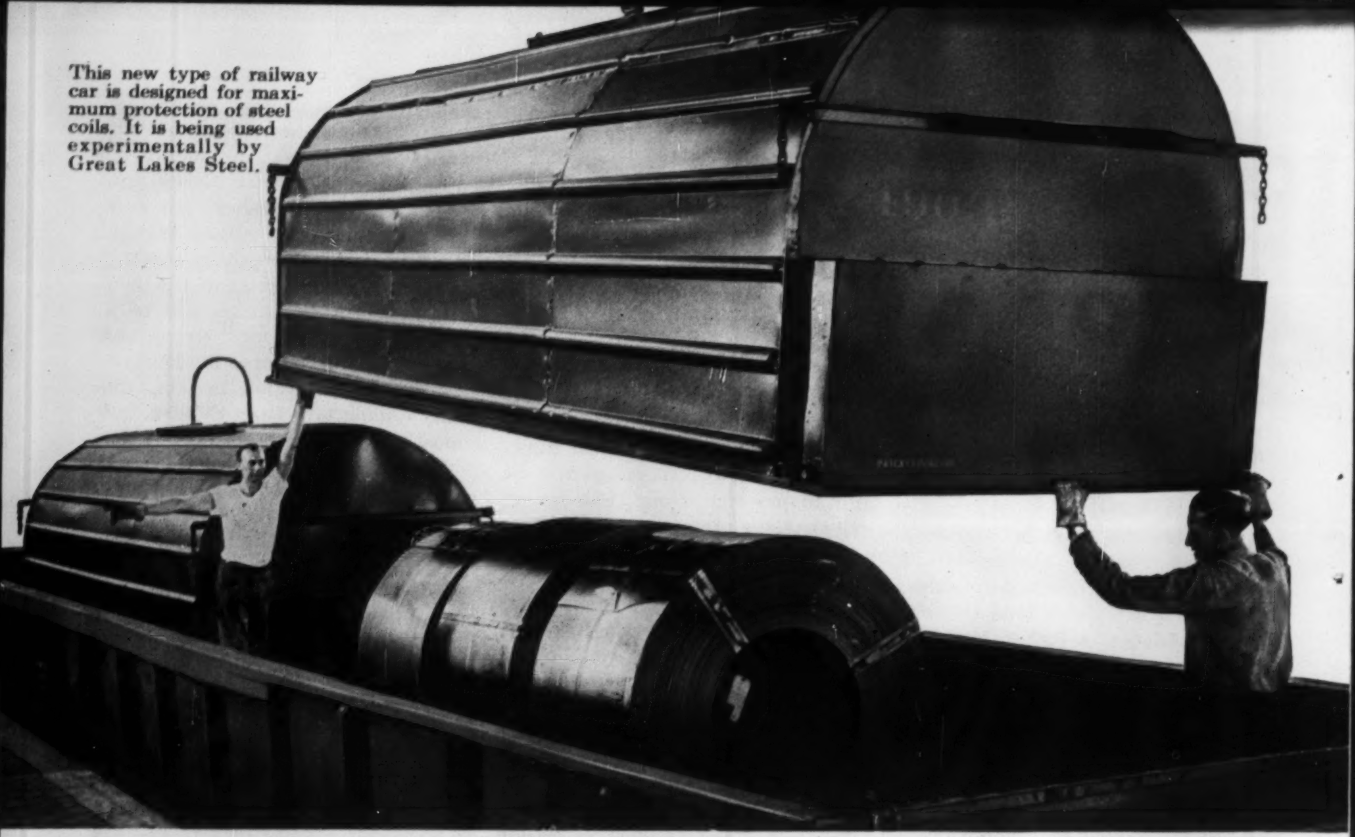
Swedish imports were up 14 per cent through the first half. Most of the gain came from a 42-per-cent increase in imports from the U. S. Inflow of autos, auto parts, machinery, coal and lubricants was stepped up. Meanwhile, exports of Swedish dollar earners like wood and iron ore fell off.

Planning — Swedish economic planning has a way of working out. The last round of steel expansion was completed just in time to save capacity from being completely swamped by domestic demand this year. Even though production is up 25 per cent from 1954's, imports had to be lifted 20 per cent above normal. It's almost certain a major new expansion is coming.

Planning is helped by the fact that the Swedes sit on top of a gold mine—the only source of high-grade iron ore in Europe. Germany and Great Britain, the major importers from Sweden, get most of their ore from her. Coming up may be a new concentration on dollar markets for manufactured goods, to replace the lost wood-products market. One sign of the times—Volvo last month announced it was entering the American market.

These articles begin a series on the economic outlook in major European countries. Next week we will cover Belgium and France.

Sweden boosts its automotive output, too



This new type of railway car is designed for maximum protection of steel coils. It is being used experimentally by Great Lakes Steel.

How Great Lakes Steel *delivers* quality

Another order receives individual attention as sheets of steel are wrapped with a waterproof covering and banded to meet the customer's specifications.

Steel coils (below) are securely blocked on a truck and trailer at Great Lakes Steel. Heavy tarpaulin cover is provided by truckers as standard equipment for additional protection.

The emphasis on quality at every stage of production at Great Lakes Steel extends right on through to the Delivery Department. There, careful attention is given to handling and packaging each coil and bundle to make sure that the customer receives his order in prime condition.

The Delivery Department has another important responsibility, too. It must see that our products reach each customer in ample time to meet his production schedules.

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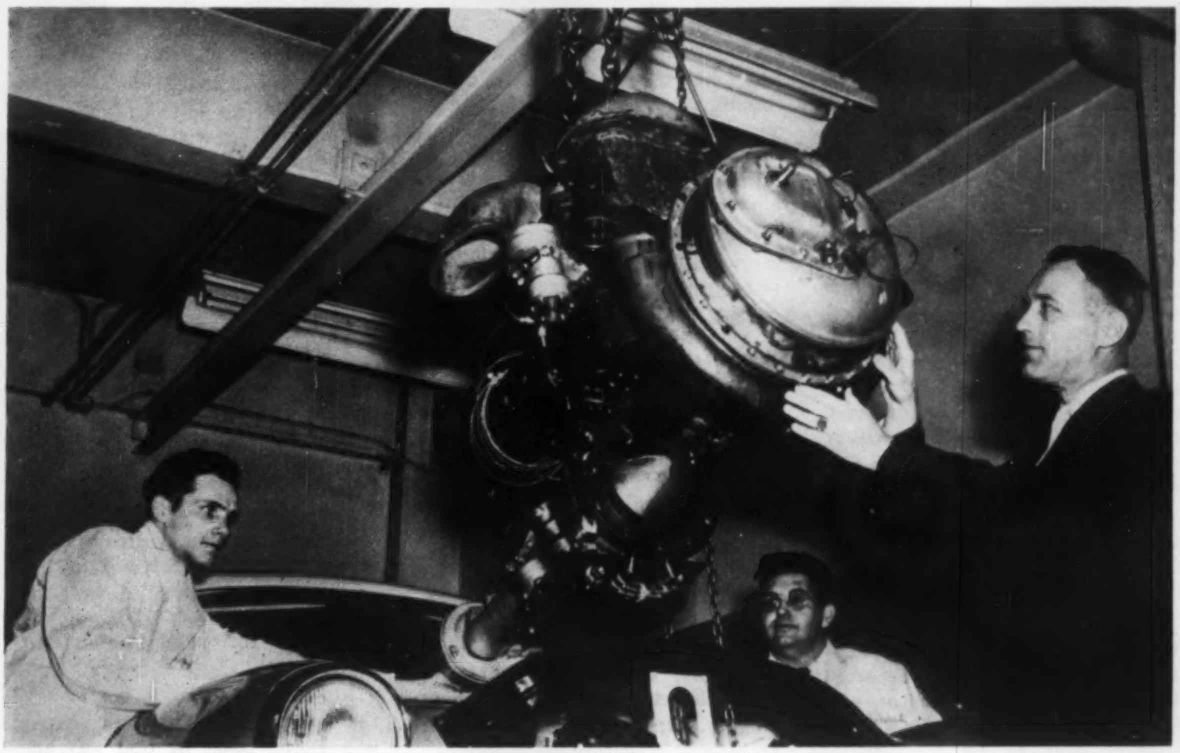
By FLOYD G. LAWRENCE *Detroit Editor*



Test units, like this Chrysler, move closer to production as . . .

Gas Turbine Race Quickens

MACHINERY SUPPLIERS are designing equipment to build the gas turbine auto engine.

A company hitherto associated with machine tools, is developing an automatic investment molding machine at the request of a major auto company. Described as a machine using plastic for the investment medium, it would produce molds, pour an austenitic alloy and eject turbine blade castings ready for further processing.

New Problems—Also under development by another supplier is a machine to automatically balance completed turbine wheel and shaft assemblies more precisely than mass production ever demanded before. Rotational speeds in the compressor unit in excess of 40,000 rpm give an idea of the problem—the reciprocating engine develops 4500 (or so) rpm.

Yet another area of equipment work is roller bearings. Turbine lab men report they will have to produce class-5 roller bearings in quantity at about the price they pay for less-finicky, class-1 bearings. Now under development is equipment which has that major feat as its objective, however much a price cut to such a fraction may jolt bearing makers.

For Example—For those who say it can't be done, automakers point to such examples as the fluid coupling, which when introduced in Europe cost several hundred prewar dollars to manufacture. One automaker today estimates his cost for a comparable part at about $4, a much greater reduction percentagewise than the bearing target. And when you speak of cost reductions, what about the cost of the gas turbine power plant as a whole, compared with reciprocating jobs?

Never a theoretically intelligent way to power a vehicle, the bang-and-wait cylinder engines of today are shaping up as similarly inefficient in the cost department as turbines come into focus. One reliable source predicts confidently that the turbine power package ultimately will total about one-half present engine costs when you take into consideration such factors as these: Elimination of the radiator, complex transmission and the multiplicity of load-and-fire parts in the reciprocating flintlocks of today.

Evolution—This, it must be em-

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phasized, is a target, and undoubtedly the first turbines to hit the road will be premium items introduced primarily for their prestige value to the automaker. From a "limited production" feature they will move into the optional equipment status before finally evolving as standard equipment. That will cover a number of years.

How will the turbine be made? You'll find plenty of disagreement among companies on specific parts, but there are trends in evidence. Turbine blades, for example, previously considered a forging job because of the military experience, seem definitely headed for casting. One company says it's holding out for investment casting to get proper surface finish and dimensional tolerance control. But Ford's Donald N. Frey, associate director of the scientific laboratory, claims shell molding looks like the best bet.

Costs—Speaking before the investment casters recently in Detroit, Dr. Frey cheerfully reported investment castings would have to be produced at one-third their present cost to be competitive. Specifically, he announced that turbine blades would have to merchandise for 15 cents a copy (maximum), which drew a turbine-like noise from his audience. Stack molded in shells, Ford rocker arms presently cost about 2 cents each and are produced in sizable quantity. Dr. Frey sees no barrier to similar production of turbine blades, and within the cost target.

Production of the turbine wheels in aircraft turbines today is done by machining the root of the blade and fitting it into a machined or forged slot on a forged rotor. This, Dr. Frey feels, is prohibitively costly for automotive use. Cast blades will have to be attached to the rotor by welding or brazing or by a second casting process whereby the rotor is cast onto the assembled blades. This latter technique, he feels, is feasible for power turbine stages and perhaps a cast turbine wheel in one piece and cast in one operation can one day be produced.

Possibilities — The compressor, made of aluminum alloys for the pressure ratios and resulting discharge temperatures, will most likely be of two-piece construction, Dr. Frey reports. The inducer portion will be a permanent mold casting and the expeller a forging, adequate for the stresses encountered. The possibility of producing a cast expeller either as a separate piece or integral with the exducer in the radial inflow turbine may be developed eventually.

In short, the rotating parts of the auto turbine trend heavily toward precision casting. Even the bearing casing, which in the Ford turbine is a nodular iron casting with quite thin wall sections, dictates development of accurate molding methods as a major factor in the coming of the turbine.

Materials—The materials to be cast, in the opinion of Dr. Frey, will be iron base (with no cobalt) and austenitic alloys (with a minimum of scarce nickel). Austenitic alloys appear necessary in such parts as compressor turbine blading or radial inflow expellers. Low-alloy, cast-ferritic materials are satisfactory for power turbine stages, either in the blades or in an all-cast structure.

The other components of the turbine loom relatively straightforward. Shafts, gears, housings, etc., promise to follow conventional practice. In fact, with the exception of the added precision foundry operations and reduction in lengthy machining lines, the engine plant of tomorrow promises to look recognizably like its counterpart of today.

U. S. Auto Output

Passenger Only

	1955	1954
January	659,719	456,765
February	675,769	443,257
March	794,188	526,076
April	754,007	533,470
May	724,891	494,250
June	649,372	504,811
July	659,979	441,451
August	614,392	436,650
September	461,592	285,860
October	517,696†	236,635
November	......	508,466
December	......	641,971
Total	......	5,518,662

Week Ended	1955	1954
Oct. 29	158,430	68,649
Nov. 5	162,278	92,766
Nov. 12	180,754	116,285
Nov. 19	179,250	133,969
Nov. 26	151,242†	111,910
Dec. 3	165,500*	144,995

†Preliminary *Estimated by STEEL
Source: *Ward's Automotive Reports*

Timing—The engine plants recently built and to be built in the next year or two won't substantially influence when the automakers will go turbine, incidentally. Citing the fact that many engine plants only two or three years old are already obsolete, one spokesman figures the turbine will arrive on the scene as soon as it is ready, regardless of this facilities factor.

The gas turbine will be ready when it does everything the auto engine of today does. Engineers are moving close to that goal. Now the key role in introduction of the turbine is shifting to the production people who at last will hold in their hands a bundle of blueprints for parts which can be made.

Big Strides—That is not to say that any phase of turbine research is a closed issue, or that any answer can be considered final. But it does represent a shift in emphasis during the past year.

It indicates, further, that introduction of the turbine looms ever larger as a matter of competitive pressure rather than technological refinement. Automakers will continue to improve their designs, but the day when the boss says "build it" cannot be far off. One source figures that within the next two years an auto company will offer limited production of a turbine-powered car, even at a heavy cost penalty, just for the prestige value of being first.

Line-up — Meanwhile, Detroit rests in the lull before the storm in turbine talk. General Motors is reportedly readying a turbine-powered sports sedan for the 1956 Motorama, and both Chrysler and Ford are rumored to be working on turbine vehicles of considerable promotional noise.

A major factor in these projects could be the upcoming speed runs for U. S. turbine powered cars during Nascar's Speed Week next February at Daytona Beach, Fla.

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The ZINC die castings are shown as they are received by Schick from the die caster. Not only are all assembly elements accurately cast, but the design details (note the raised trade mark and the recessed lettering on the nameplate) are sharply defined. *No machining is required* and, since the castings are ZINC, standard plating procedures are used. The right and left hand "whisk-its" (which snap open for easy cleaning) and the shearing head divider are bright chrome. The nameplate is finished in a soft silvery satin with the recessed lettering painted black to provide quick product identification.

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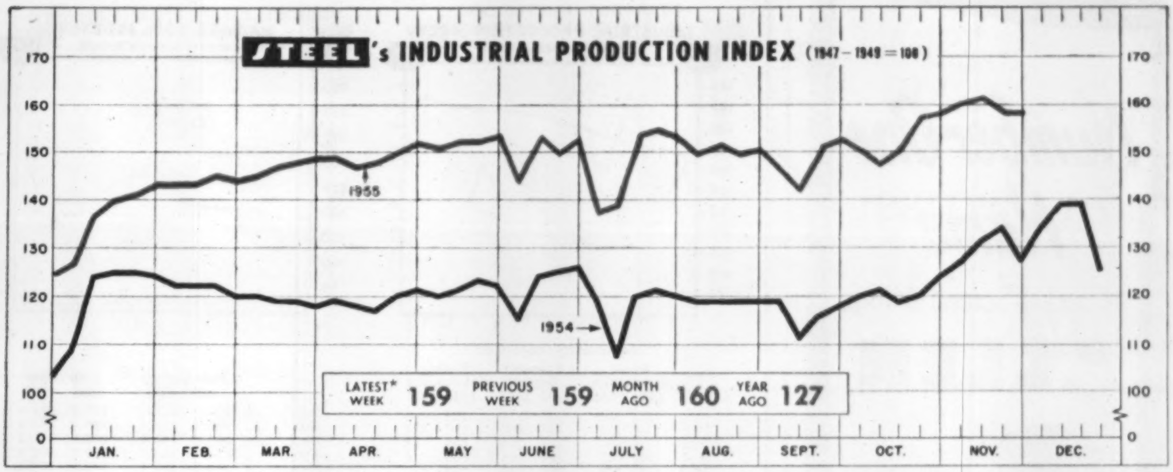

*Week ended Nov. 26. Based upon and weighted as follows: Steel Output, 35%; Electric Power Output, 32%; Freight Car Loadings, 22%; and Auto Assemblies, 11%

Commodity Prices Are Key to Uptrend

PRICES WILL BE going up in 1956.

The tipoff comes from commodity prices which have been tacking upward quietly since early this year. Higher prices paid for raw materials in the forepart of 1955 will be transmitted into consumer hikes through first half of '56.

On the Way—The middleman has been paying more already. Commerce department reports show the wholesale price index for metals and metal products has been climbing steadily since middle 1954, even before the slump ended.

In March, 1954, that index stood at 126.3. By Christmastime, it had touched 129.8 and in September this year had jumped to 141.8. It can't help but go higher.

Here's Why — Metals lead the way in a price spiral. First jumps have been spotted in scrap. Composite prices for steelmaking scrap are running about $46.33, a steady rise since January ($34.95) and the highest rate since January, 1951. They may hit $60 by mid-1956, according to Eliot Janeway, consulting economist.

Construction materials cost 8 per cent more than they did last year—sure sign that building will be more expensive in 1956. Jones & Laughlin Steel Corp.'s hike on extras for its junior beams and channels (a building "big") points the way. Other steel prices are bound to follow.

Defense Costs Swell — Defense Secretary Charles E. Wilson reports that inflation will boost the cost of defense spending for fiscal 1957, while the volume of defense needs will be about the same; materials and labor will cost more (See STEEL, Nov. 28, p. 60).

Labor will be asking for more money next year, too. Many of next year's price hikes will just be partial compensation for past wage increases, but some of them will be anticipating new labor demands.

Trend Lines—Right now the Labor department's consumer price index is holding steady. Whole-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,394[1]	2,416	1,941
Electric Power Distributed (million kw-hr)	10,750[1]	11,149	9,317
Bitum. Coal Output (1000 tons)	10,210	9,810	9,070
Petroleum Production (daily avg—1000 bbl)	6,860[1]	6,851	6,265
Construction Volume (*ENR*—millions)	$305.5	$401.7	$254.2
Auto, Truck Output, U. S., Canada (*Ward's*)	181,116[1]	213,468	139,858
TRADE			
Freight Car Loadings (1000 cars)	720[1]	772	697
Business Failures (Dun & Bradstreet, no.)	206[1]	214	208
Currency in Circulation (millions)[3]	$30,824	$30,794	$30,412
Dept. Store Sales (changes from year ago)[3]	+6%	+9%	+2%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$23,153	$20,145	$20,821
Federal Gross Debt (billions)	$279,814	$279,714	$278,780
Bond Volume, NYSE (millions)	$17,152	$17,742	$23,534
Stocks Sales, NYSE (thousands of shares)	8,977	12,430	13,688
Loans and Investments (billions)[4]	$85,781	$85,259	$85,894
U. S. Govt. Obligations Held (billions)[4]	$30,377	$30,300	$37,411
PRICES			
STEEL's Finished Steel Price Index[5]	208.90	208.90	194.53
STEEL's Nonferrous Metal Price Index[6]	265.2	265.1	217.8
All Commodities[7]	111.1	111.2	109.5
Commodities Other than Farm & Foods[7]	119.1	119.1	114.5

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*Dates on request. [1] Preliminary. [2] Weekly capacities, net tons: 1955, 2,413,278; 1954, 2,384,549. [3] Federal Reserve Board. [4] Member banks, Federal Reserve System. [5] 1935-1939=100. [6] 1936-1939=100. [7] Bureau of Labor Statistics Index, 1947-1949=100

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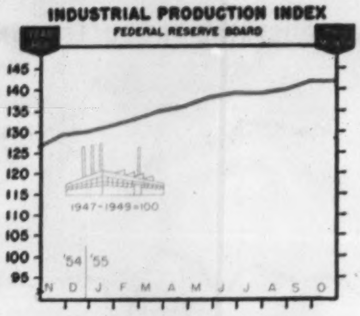
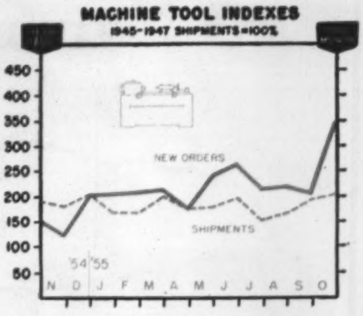
THE BUSINESS TREND



(seasonally adjusted)

	Total Production 1955	Total Production 1954	Primary Metals 1955	Primary Metals 1954	Metal Fabricating 1955	Metal Fabricating 1954
Jan.	131	125	127	111	156	155
Feb.	133	124	131	108	157	152
Mar.	135	123	135	103	158	148
Apr.	136	123	138	104	160	146
May	138	124	140	106	162	147
June	139	124	143	108	163	145
July	139	124	134	104	167	148
Aug.	140	123	139	105	170	148
Sept.	142	124	145	117	171	148
Oct.	142*	126	146*	110	173*	149
Nov.	...	129	...	118	...	155
Dec.	...	130	...	120	...	156
Avg	...	125	...	110	...	150

Federal Reserve Board. *Preliminary
Charts copyrighted, 1955, STEEL



	New Orders 1955	New Orders 1954	Shipments 1955	Shipments 1954
Jan.	203.0	173.5	167.3	319.4
Feb.	209.4	159.8	168.2	323.1
Mar.	214.6	169.6	202.5	327.2
Apr.	178.1	142.8	180.1	302.7
May	243.7	139.5	180.9	270.3
June	263.2	185.2	198.8	276.3
July	217.8	124.7	152.9	205.7
Aug.	221.3	147.9	164.6	203.7
Sept. ...	207.3	180.9	195.4	213.4
Oct.	349.7*	148.9	204.8*	191.0
Nov.	....	119.5	....	179.5
Dec.	....	202.9	....	203.4

*Preliminary
National Machine Tool Builders' Assn.

sale prices are increasing only slightly overall, although much of the pressure holding them in line comes from drops in farm commodities, not metals.

Business is good. Consumers are making more and spending more with liberal retail credit rates. They can't object too much to a price hike, especially with a personal income tax cut in sight.

Remains to be seen: Just how big a part government credit restrictions will play in keeping the price spiral from stretching out of shape.

Machine Tool Orders Rise . . .

Another sign that businessmen are still confident about 1956 is the amount of money they plan to put into production capacity.

"Business spending for plant and equipment is scheduled to jump sharply to a new peak in 1956," says Dr. Leo Barnes, chief economist, Prentice-Hall Inc., New York.

The plant and equipment outlay is expected to hit $34 billion this year. Next year it should move up to $38.5 billion.

Backing up Dr. Barnes' claim are record October orders for machine tools, as reported by the National Machine Tool Builders' Association, Cleveland.

October orders totaled $103.4 million, compared with $61.3 million in September. The industry continued to ship at the rate of $60.6 million per month. Most orders came from the Midwest and East.

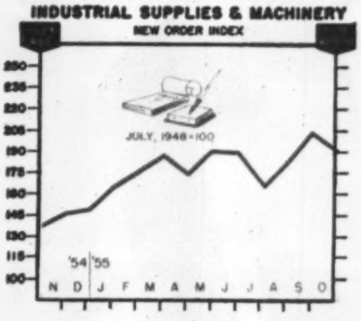
Association president, Louis Polk, head of Sheffield Corp., Dayton, O., says: "The above figures are a natural reflection of the Machine Tool Show. It is too early to judge whether the October upsurge indicates a long-term trend."

Although some orders may be for replacement machines, it looks like a lot of companies are tooling up for more business in 1956.

About Autos . . .

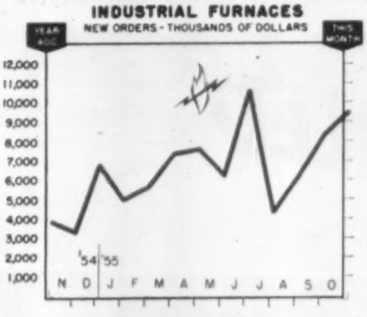
Automobile production is expected to drop somewhat next year (to 7 million plus), but most manufacturers still look for high profits and sales.

Ford Division of Ford Motor Co. should sell about 1.9 million cars in 1956, says L. W. Smead, general sales manager. This year's sales will be about 1.7 million. Big problem is lack of capacity, but three new assembly plants should help boost output.



	1955	1954	1953
Jan.	164.4	139.8	157.4
Feb.	175.1	140.5	172.9
Mar.	186.9	141.5	188.2
Apr.	173.7	131.9	182.1
May	191.6	129.4	171.1
June	189.1	136.4	160.0
July	163.7	119.4	155.3
Aug.	181.2	132.5	139.6
Sept.	203.2	148.1	150.6
Oct.	190.0	136.3	146.0
Nov.	....	146.2	144.8
Dec.	....	148.8	136.7

Amer. Supply & Machinery Mfrs.' Assn.



	1955	1954	1953
Jan.	4,973	3,086	5,398
Feb.	5,616	3,086	6,009
Mar.	7,345	4,079	5,101
Apr.	7,639	3,496	5,140
May	6,205	5,848	4,698
June	10,616	5,663	4,910
July	4,338	1,664	6,334
Aug.	6,273	2,570	7,519
Sept.	8,351	2,534	4,442
Oct.	9,568*	3,837	3,486
Nov.	....	3,188	3,430
Dec.	....	6,847	3,081

*Preliminary
Industrial Heating Equipment Assn. Inc.

Ford's price cut ($12.12) on Mainline models probably won't carry over to the rest of the trade. Mainliners now sell close to the asking price for similar Chevrolet models.

It's more likely that automakers will jump prices a bit to meet other increases. Studebaker sets that style with 3 to 6 per cent boosts on its '56 models. Look for other companies to follow suit.

Station wagons are "comers." They're getting a big play from the growing suburban crowd. A slow increase next year will build up to sizable amounts by 1957.

Aviation Holds Steady . . .

North American Aviation Inc., Los Angeles, expects sales in the coming fiscal year will be close to this year's $816.7 million.

Most North American sales are for defense needs (99 per cent). Military officials indicate the long look is for less buildup; more maintenance and replacement. Outlook: A gradual decline in aircraft spending—but not next year.

Continental Motors Corp., Detroit, points out that developments in its gas turbine and turbojet engines will mean more military business next year. Light aircraft also looks good for 1956, says the company.

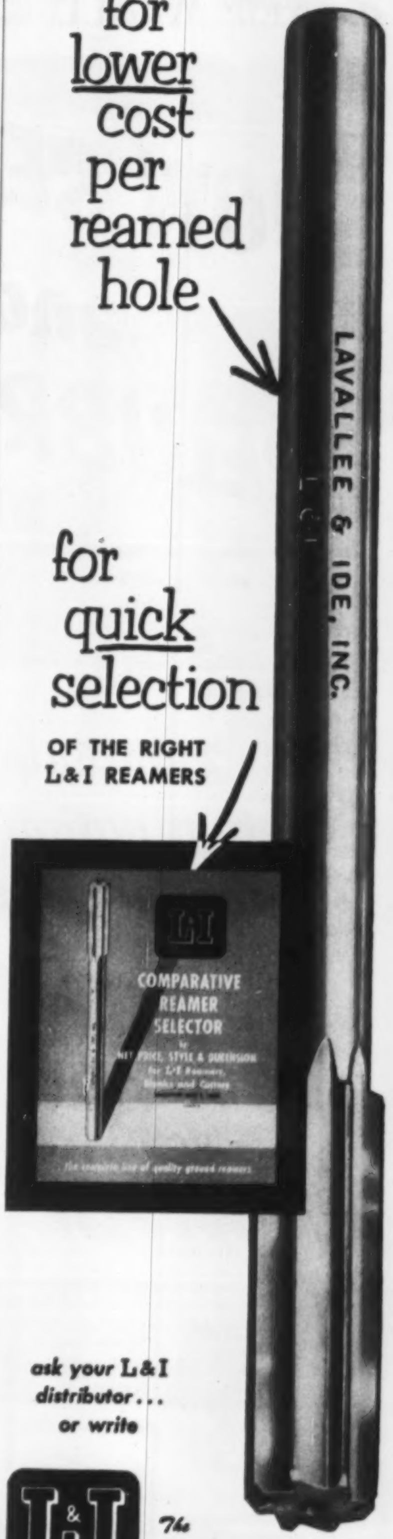
Civilian aircraft shipments numbered 341 in September; 241 in August. Last year, September shipments were 265, according to Commerce department statistics. More orders for civilian airliners will boost monthly totals by next spring.

Coal Comes Back . . .

Coal production has staged a strong comeback this year. Output through Sept. 3 reached about 302 million tons, 20 per cent up from similar 1954 levels. It should close out near the 1953 record of 457 million tons.

High steel production will keep up the demand for coal. Electric utilities, which account for 31.7 per cent of bituminous consumption, are growing rapidly. Coal prices will have to go up to meet needs. Look for boosts during the rest of this year and into '56.

In another fuel field, increased demand for oil in 1956 will be only 3.4 per cent higher than this year's usage. Increase for 1955 has been 7.3 per cent over 1954's consumption.



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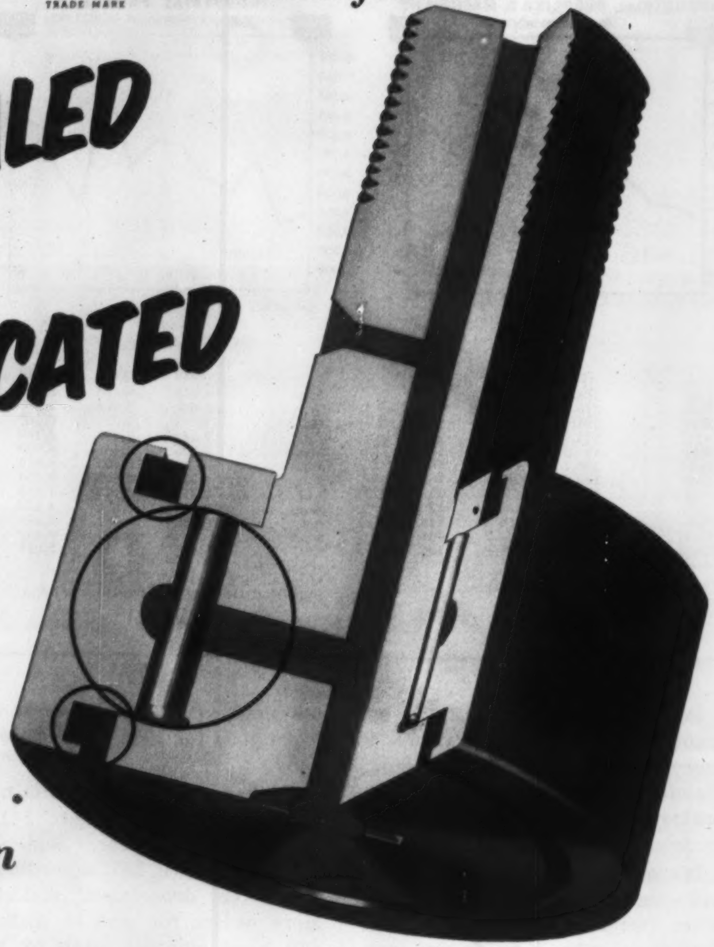

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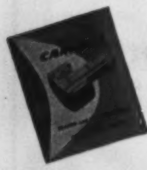

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. . . Revere Copper v. p.-Michigan Div.

G. O. BRITTON
. . . American Hoist distributor sales mgr.

WALTER E. FROEHLICH
. . . Associated Spring v. p.

Eugene P. Hawkins was elected vice president of **Revere Copper & Brass Inc.**, New York, and appointed executive head of its Michigan division at Detroit. He succeeds **Harold N. Todt**, retired. Mr. Hawkins was assistant general manager of the Michigan division.

Robert W. Christensen was named vice president-engineering for **Skil Corp.**, Chicago. He succeeds **E. J. Kelley**, now on leave of absence.

D. Frank Mederos was elected vice president and assistant to the president of **Walworth Co.**, New York. In addition, he continues in charge of sales in Canada.

Stephen J. Pentrack was made purchasing agent for the materials manufacturing department, **Westinghouse Electric Corp.**, Pittsburgh.

Hugh K. Hybarger, chief engineer of Toledo Pipe Threading Machine Co., joined **J. M. Little & Associates**, Toledo, O., as head of its engineering department.

Howard C. Jones was made director of manufacturing, **Consolidated Vacuum Division**, Consolidated Electrodynamics Corp., Rochester, N. Y. He also will direct traffic, purchasing, quality control and plant engineering operations.

G. O. Britton was made manager of distributor sales of **American Hoist & Derrick Co.**, St. Paul. He was general sales manager of Schield Bantam Co.

George Kastner, formerly chief engineer of Vickers Inc., joined **MacDermid Inc.**, Waterbury, Conn. He will specialize in promotion and servicing of mechanical equipment and also is in charge of advertising and sales promotion.

Donald W. Hill, vice president of **Crown Cork & Seal Co.** and general manager of its specialty division at St. Louis, was promoted to vice president and general manager, crown and closure division. He will be at Baltimore.

Paul W. Koenemund was appointed chief engineer of **Wheeling Steel Corp.**, Wheeling, W. Va. For the last five years he has been general manager of the Benwood, W. Va., Works.

Ralph L. Mudge Jr. was made production manager of **Burroughs Corp.'s** main plant in Detroit. He was general superintendent of engineering services.

R. R. Malik was elected president of **Sun Electric Corp.**, Chicago. **H. M. Coffman** becomes executive vice president. **Frank E. Draper** becomes vice president of the national sales division.

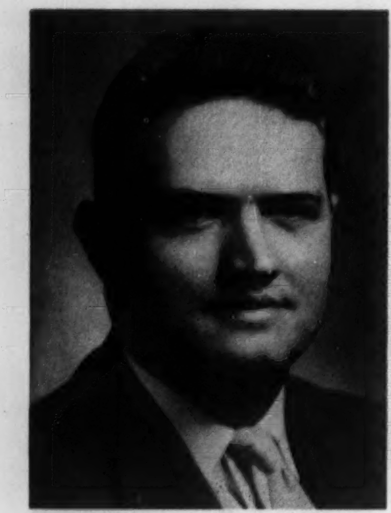
Walter E. Froehlich was elected a vice president of **Associated Spring Corp.**, Bristol, Conn., in charge of sales, research and development. He is succeeded by **G. Theodore Zahnke** as general manager of the three Bristol divisions (Wallace Barnes Co., Dunbar Bros. Co. and F. N. Manross & Sons). **Arthur J. LeVasseur** was made purchasing agent for the divisions and is succeeded as assistant purchasing agent by **John M. Reilly**.

Douglas McIlvaine fills the new post of director of research and development for **Acro Mfg. Co.**, Columbus, O. He was manager-research and development at Soreng Products.

Allied Products Corp., Detroit, elected **Carl C. Kamphausen** executive vice president in charge of metal parts production operations at Plants 1, 3 and 5.

Taft-Peirce Mfg. Co., Woonsocket, R. I., appointed **Russell W. Grabinsky** assistant superintendent, small tool and gage division.

Promotions in the **Doehler-Jarvis Division** of National Lead Co., New York, include: **Fred W. Burgie**, to assistant general sales manager; **Charles I. Hodgson**, to manager of sales of the Toledo, O., plants, succeeding Mr. Burgie; **John W. Thees**, to manager of To-



DR. DAVID C. EKEY
. . . Lebanon Steel director-research

HAROLD J. COLEMAN
. . . Chandeysson Electric sales mgr.

WILLIAM E. DAILY
. . . Mechanical Steel Tubing v. p.

ledo plant No. 1; **Kenneth F. Koegler,** to manager of Toledo plant No. 2; and **Robert H. Mayer,** to manager of the Grand Rapids, Mich., plants.

Dr. David C. Ekey, recently on the staff of Pennsylvania State University and head of its foundry course, joined **Lebanon Steel Foundry,** Lebanon, Pa., as director of research. During the last few years he also served as project engineer at Chambersburg Engineering Co., the Office of Technical Services and J. I. Thompson Co.

Charles B. Hull III was named market analyst for **DeWalt Inc.,** Lancaster, Pa. He was associated with General Aniline & Film Corp., Ozalid Division.

Jones & Laughlin Steel Corp. appointed **Richard G. Carney** district sales manager at St. Louis; **Chester M. Kuhns,** district sales manager at Cleveland; **Alfred C. Pollock,** district sales manager at Columbus, O., and **Robert B. Clark,** assistant district sales manager at Chicago.

Howard K. Beck was elected president of **Jackson & Church Furnace Division, Saginaw, Mich.,** Norbute Corp. subsidiary. **F. C. Adams** was made vice president of the division.

Temco Aircraft Corp., Dallas, appointed **Charles C. Convers** and **E. F. Janesic** senior contracts administrators.

Harold J. Coleman was made sales manager of **Chandeysson Electric Co.,** St. Louis. He was a district manager for Essex Wire Corp.

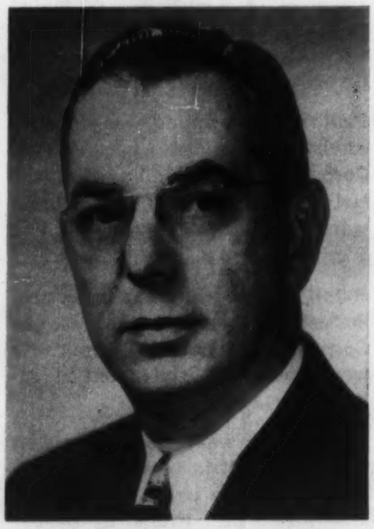
Lee H. Clark, general manager of **Pennsylvania Salt Mfg. Co.'s** Sharples Chemicals Division, was named vice president of the parent company, Philadelphia.

Crucible Steel Co. of America, Pittsburgh, elected **James D. Glenn** vice president-sales and **Maurice J. Day** vice president-research and development. Mr. Glenn was general manager of sales. Dr. Day was director of research and development.

William E. Daily was elected vice president and a director of **Mechanical Steel Tubing Corp.,** New York. He also assumes similar offices in two affiliated companies, Haydon Products Corp. and Insulation Materials Corp., both of New York. Mr. Daily formerly was a sales manager for Walker Bros., Conshohocken, Pa.

Kensico Tube Co. Inc., Mt. Kisco, N. Y., appointed **Elizabeth M. Wilkie** assistant sales manager. Miss Wilkie was formerly with United Wire & Supply Corp.'s New York office.

Robert B. Clark was made assist-



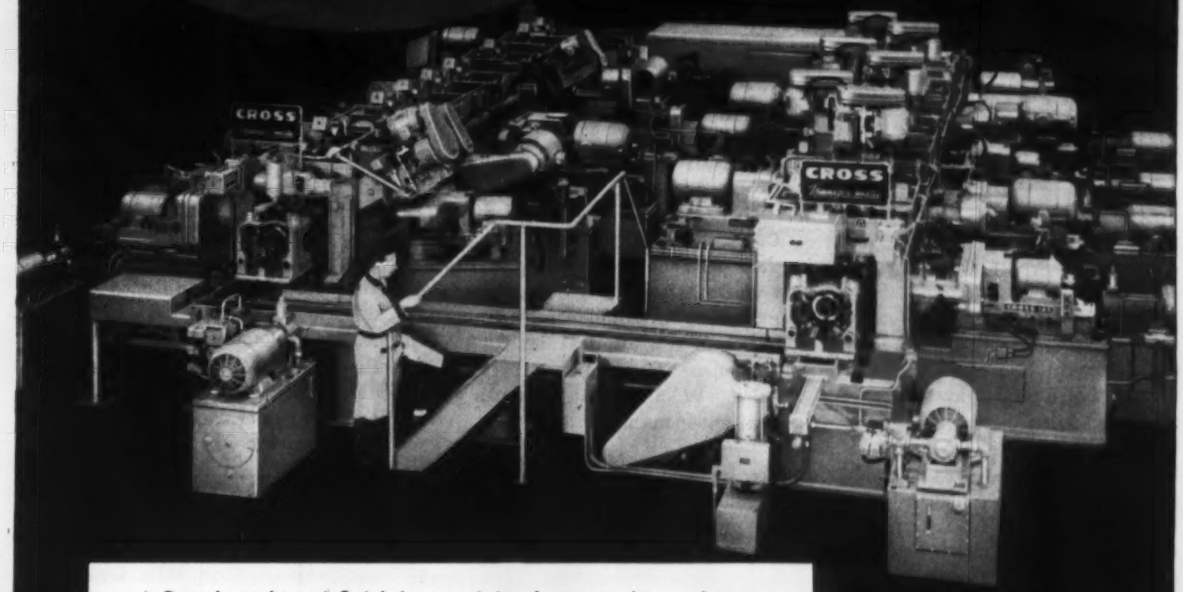
JAMES D. GLENN

MAURICE J. DAY

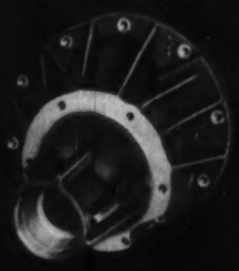
. . . Crucible elects two vice presidents

Mills, Drills, Bores, Turns Differential Gear Carriers

Another Transfer-matic by Cross

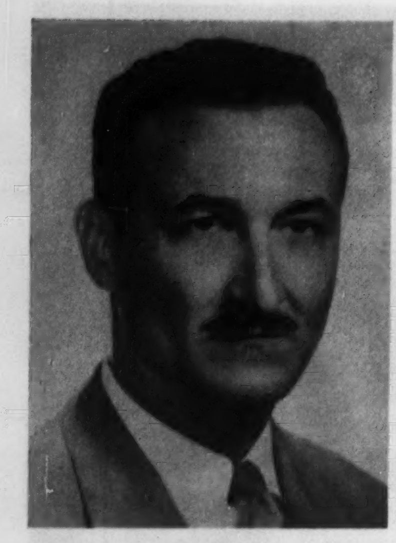


- ★ Rough and semi-finish bores pinion bores and cross bores; rough and finish faces and turns pilot diameter of torque tube flange; mills faces of cross bore bosses; spotfaces flange mounting holes; drills, chamfers, reams and taps all other holes except flange holes.
- ★ 115 pieces per hour at 100% efficiency.
- ★ 73 operations: 8 milling, 8 boring, 2 crossfacing, 1 turning, 18 drilling, 10 spotfacing, 7 chamfering, 2 reaming, 9 tapping, 8 probing.
- ★ Complete interchangeability of all standard and special parts for easy maintenance.
- ★ Palletized work holding fixtures with hydraulically operated torque wrenches for clamping and unclamping parts.
- ★ Washing and drying unit for cleaning fixtures between last cutting station and loading station.
- ★ Other features: Construction to J.I.C. standards; hardened and ground ways; hydraulic feed and rapid traverse; automatic lubrication system.



Established 1898

THE **CROSS** CO.
DETROIT 7, MICHIGAN
Special MACHINE TOOLS



A. L. CANEY
. . . Tuthill Pump sales manager

C. H. WILLS
. . . Michigan Abrasive v. p.

GEORGE R. MILNE
. . . National Carbide president

ant sales manager at Chicago for **Jones & Laughlin Steel Corp.**

A. L. Caney was made general sales manager of **Tuthill Pump Co.**, Chicago. He was district representative in the Midwest for Diamond Chain Co.

Frank A. Grooss was appointed an assistant to Vice President **G. E. Burks**, who has administrative responsibility for the engineering and research departments at **Caterpillar Tractor Co.**, Peoria, Ill. Mr. Grooss was assistant chief engineer at the company's new plant in Decatur, Ill., and is succeeded by **A. W. Sieving.**

B. L. Lerch was made Midwest regional manager of **General Controls Co.**, Glendale, Calif.

C. H. Wills fills a newly created vice presidency at **Michigan Abrasive Co.**, Detroit. He heads a program for development of new products and new applications for present ones. He was vice president-sales. **W. S. Hoskin** becomes general sales manager.

M. R. McLary was elected vice president of **Ingersoll Products Division**, Borg-Warner Corp., Chicago. He has been works manager since December, 1954, and continues in that position.

Edward J. Lunney was made chief engineer in charge of the research and analysis department of **Barry Controls Inc.**, Watertown, Mass. He formerly was with the Wright Air Development Center, U. S. Air Force.

George R. Milne, vice president-operating, was appointed president of **National Carbide Co.**, a division of Air Reduction Co. Inc., New York. He succeeds the late **J. Carl Bode. Russell T. Lund,** vice president, succeeds Mr. Milne as vice president-operating. Mr. Milne's headquarters will be at New York. Mr. Lund remains at Calvert City, Ky.

Edwin C. Geisher was made chief engineer of **Bush Mfg. Co.**, Hartford, Conn.

P. A. Beckjord was made manager of electric utility sales for the central region of **Westinghouse Electric Corp.**, Pittsburgh. He succeeds **P. T. Lagrone,** now electric utility sales manager for the company.

OBITUARIES . . .

Gordon M. Mather, 87, chairman of the board of **Mather Spring Co.**, Toledo, O., died Nov. 16.

Harold H. Henricks, 66, president, **Youngstown Steel Door Co.**, Cleveland, died Nov. 20.

Gerald G. Lipke, 41, sales manager for standard products, **Hagan Corp.**, Pittsburgh, was killed in an air liner crash in Colorado on Nov. 1.

Nils A. Tornblom, 59, director of design and development engineering for **Revere Electric Mfg. Co.**, Chicago, died Nov. 15.

Frank E. Payne, 72, chairman of **Crane Packing Co.**, Chicago, died Nov. 20. He was a co-founder of the company, and its president from 1917 to 1951.

George Gorton Sr., 90, president of **George Gorton Machine Co.**, Racine, Wis., died Nov. 22.

Charles F. Feledy, 63, development engineer for **Armco Steel Corp.**, Middletown, O., died Nov. 22.

Eustace E. Blundell, 77, president and general manager of **Commercial Centerless Grinding Co.**, Cleveland, died Nov. 18.

Arvid H. Svensson, a founder and former owner of **Buffalo Machine Mfg. Co.**, Buffalo, died Nov. 19.

Seth T. McCormick, 56, a field engineer with the wire rope division of **Bethlehem Steel Co.**, New York, died Nov. 20.

R. DeWitt Spradling, 61, president and chairman of **Armco, Argentina**, and **Armco, Uruguay**, subsidiaries of **Armco Steel Corp.**, Middletown, O., died recently.

YOU PAY NO MORE THAN 59 CENTS PER HOUR

for this new Model C Autometric precision boring machine when put to work in your plant with...

Kearney & Trecker

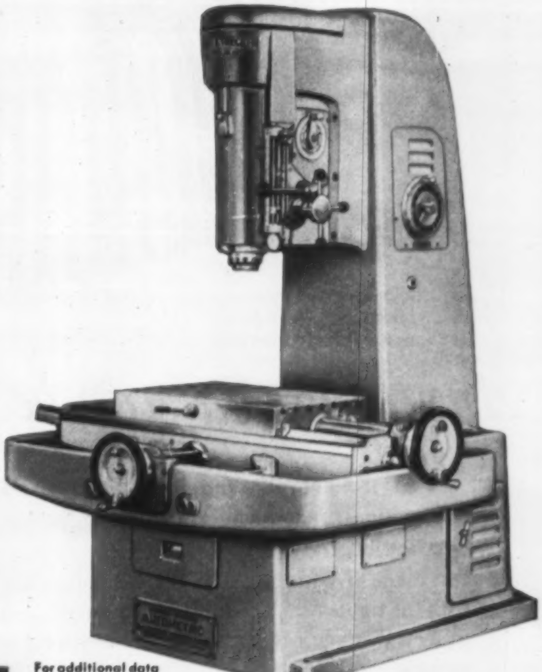
TOOL-LEASE PROGRAM

THINK of it! You can lease this new Model C Autometric boring machine for as little as 59 cents per hour! It's an exceptionally low price to pay for this modern, high precision-built boring machine, designed specifically for performing the most exacting operations in your toolroom, laboratory or shop.

Under Plan "A," one of three possible lease agreements, you make two semi-annual payments, totaling 25% of the machine's price during each of the first three years. And only 10% during each of the last four years. What's more, this lease agreement permits you to terminate or purchase your Model C Autometric at the end of the third year or at the end of any year thereafter.

Under Kearney & Trecker's Tool Lease program you can rent any of over 250 different types and sizes of standard milling machines or precision boring machines. All are available under three basic plans, with varying options to continue or terminate the lease, or to purchase the equipment. If you require special machinery or heavy-duty CSM bed types, special agreements will be considered.

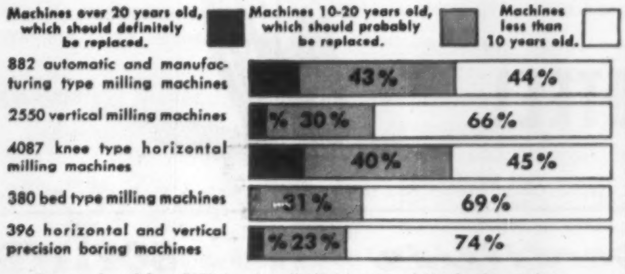
For complete information on Tool-Lease, see your Kearney & Trecker representative or mail coupon to Kearney & Trecker Corp., 6784 W. National Avenue, Milwaukee 14, Wisconsin.



For additional data on this machine, see our catalog in Sweet's.

MACHINE TOOL OBSOLESCENCE IS BECOMING CRITICAL! WHERE DO YOU STAND?

Precision Mechanisms Industry—Includes machines for laboratory, scientific and engineering instruments; mechanical measuring, controlling instruments; optical, surgical; medical, dental instruments and equipment; photographic equipment; watches, clocks, clockwork devices, and parts. Of the total 8,295 machines, 10% are over 20 years old, over 36% are 10 to 20 years old.

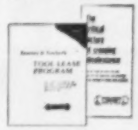


Figures adapted from 1953 American Machinist survey of Metalworking Industry.

TOOL LEASE
KEARNEY & TRECKER
MILWAUKEE
MACHINE TOOLS
EQUIPMENT ®

KEARNEY & TRECKER CORP.
6784 W. National Ave., Milwaukee 14, Wis.

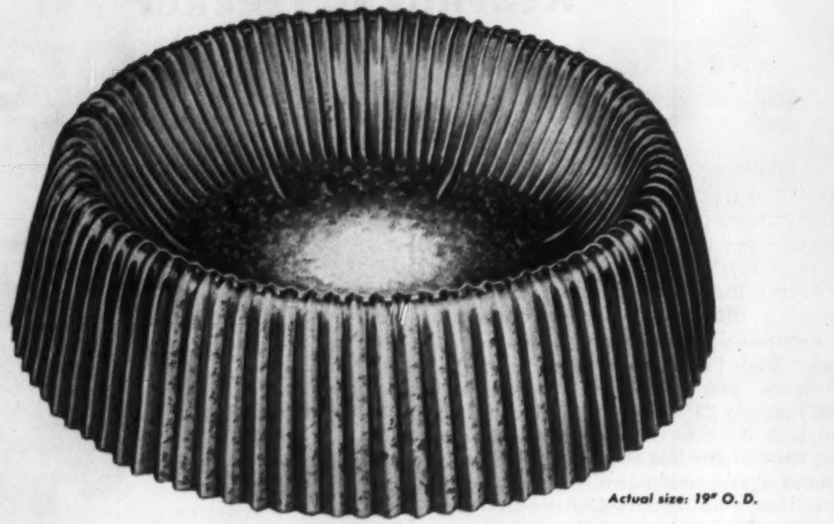
Please send me Bulletin TL-10A on Tool-Lease Program and booklet titled "Critical Picture of Creeping Obsolescence."



Name..........
Title..........
Company..........
Address..........
City.......... Zone.......... State..........

A CHALLENGE:

THE STRONGEST MADE BY ANY GALVANIZED SHEET—



Actual size: 19" O. D.

Anything that can be made of steel sheets

WITH a complicated reverse draw and tight corrugations, manufacturing this hog feeder *could* have been a problem. *But it wasn't.*

It is made of Wheeling SOFTITE, the galvanized sheet with the tightest zinc coating yet produced...so tight, in fact, that you can use it to make anything you can make of steel sheets.

That's SOFTITE...*Wheeling* SOFTITE...made by the company that led with the development of COP-R-LOY, the original copper-bearing steel pipe and perfected DUCTILLITE, the original cold reduced tin plate which revolutionized the tin plate industry, and opened new fields to the can maker and packer. Now, because of the unprecedented demand for SOFTITE Galvanized Sheets, Wheeling has been forced to triple its production facilities in 1955.

can be made of

WHEELING

SOFTITE®

galvanized sheets!

IT'S WHEELING STEEL

WHEELING STEEL

DISTRICT SALES OFFICES—Atlanta, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Detroit, Houston, New York, Philadelphia, St. Louis, San Francisco, Wheeling

FIRST CAME **COP-R-LOY.** THEN *Ductillite.* NOW WHEELING **SOFTITE**

Westinghouse Plant

Facility at Blairsville, Pa., bridges gap between research and commercial applications

WESTINGHOUSE Electric Corp.'s metals plant at Blairsville, Pa., is approaching full operation. It was built for metals research, development and production and will function as a clearinghouse for metals information.

The main purpose, says W. M. Trigg, plant manager, "is to bridge the gap between research and the commercial application of metals in the electrical industry." Although emphasis will be on the development of new metals for end use in Westinghouse products, he added, customer orders will be accepted for special metal alloys, metal products and development services.

Breakdown — Westinghouse has invested about $6 million at Blairsville to create an integrated and self-contained unit for complete metallurgical development. The plant is organized into two major departments: Wrought alloys and precision castings.

Facilities include equipment for vacuum melting, forging, hot rolling, cold rolling, conditioning, pickling and heat treating. Equipment for limited manufacture of powder metal parts is provided.

In addition, facilities for investment and shell mold casting have been installed. (An engineering story on the Blairsville facility will appear in the Dec. 12 issue of STEEL.)

Kaiser To Install Presses

Kaiser Aluminum & Chemical Corp., Oakland, Calif., will install four extrusion presses at its plant at Halethorpe, Md. This will raise the plant's annual capacity to 46,200,000 lb of extrusions.

Chromalloy Moves Facilities

Chromalloy Corp. moved its offices from New York to 450 Tarrytown road, White Plains, N. Y., is occupying its plant in that city this month. Chromalloy's new plant contains more than 12,000 sq ft of floor space, almost double that of former facilities. The firm's process increases the heat, wear and corrosion resistance of ferrous metals by high-temperature diffusion of chromium into the surface.

Aurora Metal Co. Expands

Aurora Metal Co., Aurora, Ill., expanded its production facilities to include a complete line of copper-base shell mold castings. Fully automatic equipment will accommodate parts up to 20 x 30 in. (pattern size). This firm also offers complete engineering, metallurgical, pattern making and finish machining facilities.

A. Milne Opens Detroit Branch

A. Milne & Co., New York, opened a tool steel warehouse at 4820 Wabash Ave., Detroit. W. Ted Nagorsen is manager of the new facility.

Establishes Birmingham Branch

All-State Welding Alloys Co. Inc., White Plains, N. Y., established a southern division office at 3 Pamona Drive, Birmingham. Charles Brown is manager of the division.

Ryerson Enlarges Facilities

Joseph T. Ryerson & Son Inc., Chicago, is enlarging its Buffalo plant and office space by almost 50,000 sq ft. The added space will be used to stock larger tonnages of stainless steel, including cold-finished carbon and alloy steel bars, welded and seamless carbon steel mechanical tubing and carbon steel sheets. It will also house the firm's sheet steel processing operations, now carried on in leased space.

Offers Stainless Steel Award

Allmetal Screw Products Co. Inc., Garden City, New York, is sponsoring an annual award for the author of the article of most value and interest to those who specify or buy stainless steel parts or components. The award was initiated when Allmetal, manufacturer of stainless fasteners, found

(*Please turn to page* 112)

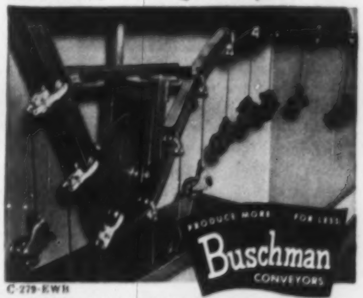
How many places will BUSCHMAN Cable Conveyors cut costs in your operation?

Throughout your plant . . . Buschman "Universal" Cable Conveyors can save you real dollars in handling light and medium loads.

How? Lower initial and maintenance costs than other overhead types . . . smoother operation . . . shorter radius curves and dips permit more complete utilization of space, require less room inside industrial ovens, washers, dip tanks, etc. . . . faster, easier rearrangement.

Investigate the savings possible in *your* plant! Contact your local Buschman representative or write for catalog.

Below: 9½" radius Quick Dip



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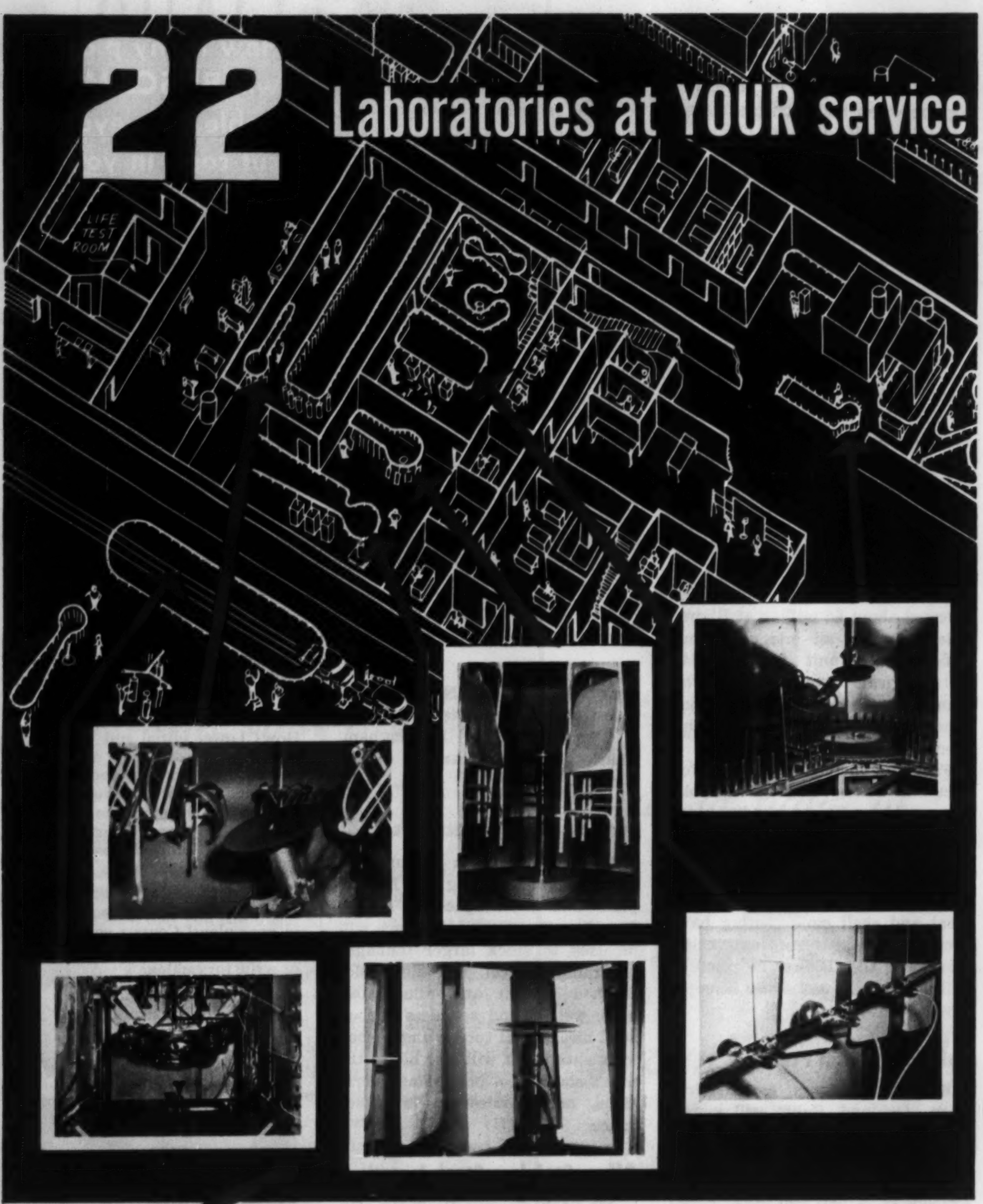
THE E. W. BUSCHMAN CO.
4496 Clifton Ave. • Cincinnati 32, Ohio
CONVEYOR SYSTEMS FOR ALL INDUSTRIES
ENGINEERED • MANUFACTURED • INSTALLED

22 Laboratories at YOUR service



YOUR JOB, LIKE THESE SHOWN ABOVE, WILL BE TEST PROVEN

under simulated production conditions to determine cost-saving benefits and other advantages. Ransburg also maintains other test facilities in Los Angeles, London, England; Bad Hersfeld, Germany; Paris, France and Sydney, Australia.

to prove the painting of YOUR products with

RANSBURG

Electrostatic Painting Processes

Let us make laboratory tests and prove the advantages and cost-saving benefits of painting YOUR products AUTOMATICALLY with one of the Ransburg Electro-Spray Processes.

GET THE FACTS . . . IT COSTS YOU NOTHING!

STEP BY STEP—HERE'S WHAT YOU GET . . .

- Survey of your plant by Ransburg's experienced field engineers, including savings estimate.
- Lab painting demonstration of your products, using equipment closely simulating your own production conditions.
- Accurate measurements of paint film thickness.
- Engineering report of detailed tests to determine paint and labor savings.
- Coated samples of your job, lab production photos, and even movies if desired.
- Detailed drawings of equipment and workholder.

All of the above without obligation to you. And, before equipment is installed you receive detailed, pre-installation instructions. Too, a well-qualified, experienced engineer supervises installation and trains your operator on the job. Ransburg offers continuing laboratory and field service to help you with any of your finishing operations.

Ransburg
ELECTRO-COATING CORP.
Indianapolis 7, Indiana

● **First,** Ransburg sales engineers will make a survey in your plant to check the possibilities of using Electrostatic Spray Painting on your products. Next, you will send samples of your unpainted products—with paint—to the Ransburg laboratories in Indianapolis.

Here, the technical staff takes over. The Ransburg Engineering staff—which includes PH.D's and Masters in Physics, Science, Electrical, Mechanical and Chemical Engineering—makes a complete study of your job. Not only do they have the necessary academic training, but they have the "know how" gained from years of actual experience in the field. Ransburg, you know, was the pioneer in Electrostatic Spray Painting 15 years ago. Engineers and well-qualified technicians have at their disposal every facility for conducting complete tests, simulating your own production conditions. They'll decide which type conveyor is best suited for your job. (There's a conveyorized lab set-up—22 in all—to handle products ranging in size from automobile bodies and chassis to small components, such as window hardware.) They'll design workholders, if necessary, and determine exactly how your job can be run to your best advantage. Details, such as fixture spacing, will be worked out too.

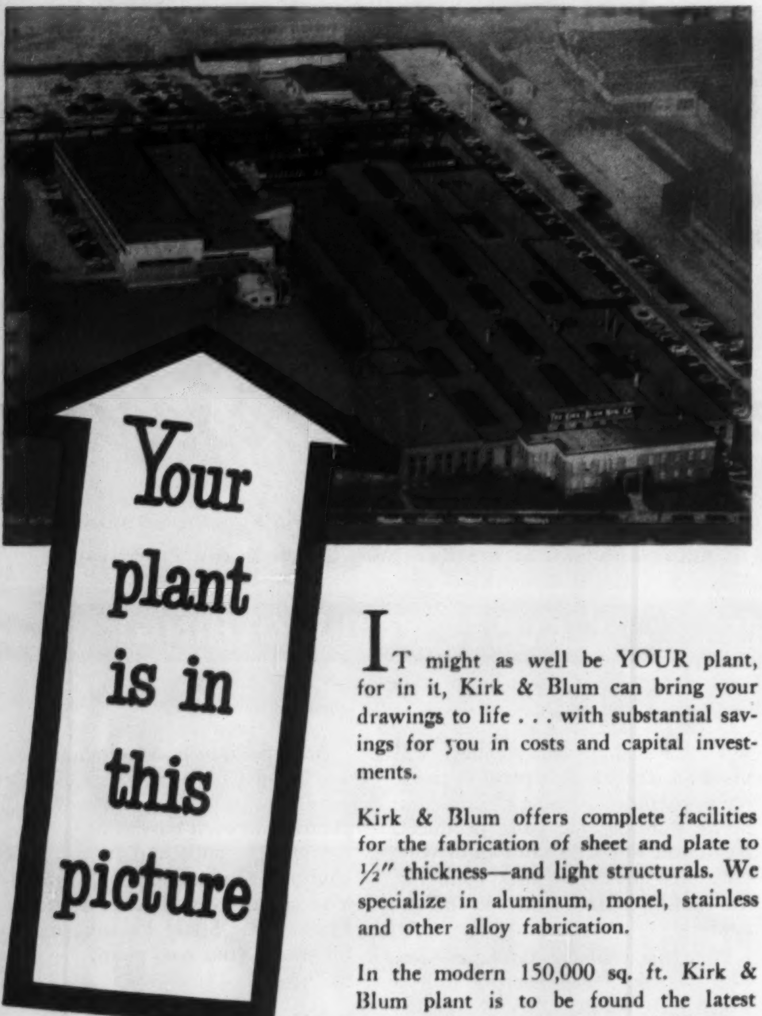
After preliminary studies and tests, you are invited to Indianapolis to see your job run in the lab. If you wish, photos and even movies of your test run can be made and furnished for your own production people to study. You see first-hand what Ransburg Electrostatic Spray Painting can do for you in your own plant.

YOU GET PAINT AND LABOR SAVINGS

Paint usage is accurately measured during the demonstration. The Ransburg No. 2 Process will provide savings up to five times the paint mileage of hand spray. And, one unit can do the work of many hand sprayers. You will see the improved, uniform quality of the work . . . you'll know what kind of increased production to expect, and you can recognize labor savings. ALL OF THIS WITHOUT OBLIGATION.

Ransburg service doesn't end there. After the equipment is installed in your plant—with our supervisory help—we will train your operator and continue to work with your finishing department. Our technically-trained field service engineers are always available to assist with any of your finishing problems.

Briefly, that's our story. Now it's your move. Call or write Dept. S.



IT might as well be YOUR plant, for in it, Kirk & Blum can bring your drawings to life . . . with substantial savings for you in costs and capital investments.

Kirk & Blum offers complete facilities for the fabrication of sheet and plate to ½" thickness—and light structurals. We specialize in aluminum, monel, stainless and other alloy fabrication.

In the modern 150,000 sq. ft. Kirk & Blum plant is to be found the latest metalworking equipment available, operated by skilled sheet metal craftsmen. Overhead cranes, to 25 ton capacity, serve entire assembly areas and interior rail siding. A new warehouse contains extensive inventories of materials. Coordinated for speed, versatility and accuracy, these facilities assure successful and economical completion of your products.

- Weldments
- Components
- Assemblies
- Sub-Assemblies
- Cabinets
- Housings
- Enclosures

THE KIRK & BLUM MANUFACTURING CO.
3238 Forrer Street
Cincinnati 9, Ohio
Established 1907

KIRK & BLUM
SHEET METAL FABRICATION

(*Concluded from page* 109)

that although annual U. S. stainless volume had doubled since 1945, communication about its application is at the prewar level.

Aluminum Fabricators Unite

Kawneer Co., Niles, Mich., producer of aluminum products for building, aircraft and appliance industries, purchased Weatherstone Windows Ltd., Toronto, Ont., fabricator of aluminum windows and curtain walls.

U. S. Graphite To Expand

Wickes Corp.'s United States Graphite Division, Saginaw, Mich., plans a $600,000 expansion program. The project includes a $500,000 addition to the plant's carbon - finishing department, a $100,000 addition to the office building and a new loading dock.

Walworth Buys Pipe Fabricator

Walworth Co., Greensburg, Pa., maker of valves and pipe fittings, purchased Southwest Fabricating & Welding Co. Inc., Houston, one of the leading pipe fabricating companies in the U. S.

Rockwell Builds on West Coast

Rockwell Mfg. Co., Pittsburgh, will build a 100,000-sq-ft warehouse, assembly and repair plant at Porterville, Calif. The plant will be completed by early 1956 at an estimated cost of $1 million.

Tay-Holbrook Inc. To Move

Tay-Holbrook Inc., supplier of plumbing and heating equipment with branches throughout California, has leased a $1-million sales office, warehouse and distributing center in San Leandro, Calif. Operations will start in April.

Rodney Metals Opens Branch

Rodney Metals Inc., New Bedford, Mass., opened a branch office and warehouse at 4312 Pacific Way, Los Angeles 23, Calif. It's under the supervision of William Brown. The company specializes in precision rolled, wide, thin stainless steel strip. Other products

FORGEABILITY

MACHINABILITY

HEAT TREATING PROPERTIES

BALANCED TO CUT YOUR COSTS

J&L
STEEL

Forging Quality Steel Bars

Automotive Steering Knuckle Support forged from 1-15/16" Hot Rolled Round AISI Grade 1340

Balance—the correct proportion of forgeability, machinability, and heat treating properties in forging steels—directly affects your profits. Balance of these properties reduces operating costs, and also produces higher-quality, finished forgings.

Careful metallurgical control of every process from ore mine to finishing mill at J&L assures the production of forging steels with the correct balance of properties you require.

Whether you produce rugged, heavy-duty forgings or lightweight, high-strength parts, J&L forging steels give the best results. Our staff of experienced metallurgists is available to help you establish the specifications to fit your need. Write or phone our nearest district office.

Jones & Laughlin
STEEL CORPORATION — *Pittsburgh*

J&L FORGING STEELS   EXACTLY TO SPECIFICATION

FROM THIS
TO THIS
...at Lower Cost per Unit with
KEYSTONE
"SPECIAL PROCESSED"
COLD HEADING WIRE

Due to the unusual deep socket in the above Adjusting Screw it could not be formed from regular annealed and processed cold heading wire.

Keystone's metallurgist recommended Keystone "Special Processed" wire. The manufacturer has now standardized on "Special Processed" wire for this and other difficult cold headed parts. His results have been improved quality, increased production and lower cost per unit.

The superior grain flow characteristics of Keystone "Special Processed" wire provide the necessary upsetting and die forming qualities to withstand the terrific metal displacement in your most difficult cold heading jobs. Your inquiry is welcomed.

Keystone Steel & Wire Company
Peoria 7, Illinois
Industrial Wire Specialists

are specially treated prepainted steel strip that can be blanked, formed and deep drawn; precision rolled shim steel; and aluminum strip.

Hamilton Mfg. Buys Tool Line

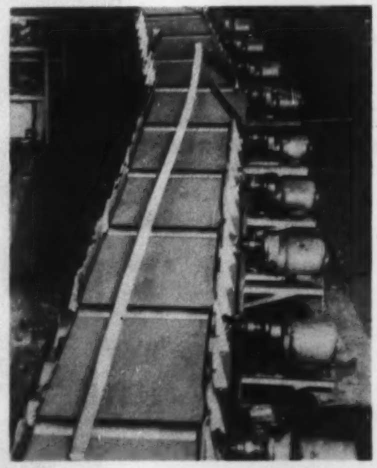
Hamilton Mfg. Co., New Haven, Conn., purchased Barnaby Tools Division of Barnaby Mfg. Co. Inc., Bridgeport, Conn., maker of screw machine and turret lathe tools. Stanley Roczynski has been appointed to head all manufacturing at Hamilton Mfg.

Instrument Firm Opens Branch

Research & Control Instruments Division, North American Philips Co. Inc., Mt. Vernon, N. Y., opened a branch office at 1485 Bayshore Blvd., San Francisco. Philip I. Wolf is manager of the office.

Will Build Instrument Plant

Helipot Corp., a division of Beckman Instruments Inc., South Pasadena, Calif., will construct a $2-million plant at Newport Beach, Calif., for production of helical potentiometers and control instruments for electronic devices. Con-



More Horseshoe Steel

Powered-roller tables, built and installed by E. W. Bliss Co., Salem, O., are among the new equipment in Phoenix Mfg. Co.'s $4-million merchant bar mill at Joliet, Ill. With a monthly capacity of 12,000 tons, the mill is geared for high-speed output and achieves top mechanization with minimum investment per ton of capacity struction is expected to be completed by September, 1956.

Jacobson Nut Is Building

Jacobson Nut Mfg. Corp. is building a plant on Mark road, Kenilworth, N. J. The firm makes a complete line of nuts.

ASSOCIATIONS

J. L. Robinson, vice president of Jabez Burns & Sons Inc., New York food processing equipment and machinery company, was elected president of the **National Metal Trades Association,** Chicago. He succeeds E. S. Day, vice president and general manager of Collyer Insulated Wire Co., Pawtucket, R. I. Other association officers are W. F. Newhouse, Saranac Machine Co., Benton Harbor, Mich., first vice president; H. M. Ramel, Moog Industries Inc., St. Louis, second vice president and treasurer.

Grant S. Diamond, president, Electro Refractories & Abrasives Corp., Buffalo, was elected president of the **Grinding Wheel Institute,** Cleveland. He succeeds C. E. Etheridge, Macklin Co., Jackson, Mich.

Earl H. Houck, supervisor of safety and welfare at the Aliquippa Works, Jones & Laughlin Steel Corp., was elected general chairman of the **Metals Section, National Safety Council,** Chicago.

Service Tools Institute, New York, elected Hoyt C. Pease and E. J. Muldoon president and vice president, respectively. Mr. Pease is vice president and general manager of the Stanley Tools Division, Stanley Works, New Britain, Conn. Mr. Muldoon is sales manager, Hand Tool Division, New Britain Machine Co., New Britain, Conn.

Eastern Michigan chapter of **Society of Die Casting Engineers Inc.,** Detroit, elected the following officers for 1956: Chairman, John Lapin, Saginaw Bay Industries, Bay City, Mich.; vice chairman, Marshall Aberle, H & M Industries Inc., Flat Rock, Mich.; secretary-

(*Please turn to page* 118)

Engineered for PROFIT

If you, like most businessmen, are seeking a steady PROFIT builder for your business, you'll find that ENGINEERED "Automatic" Sprinkler FIRE PROTECTION is the answer.

It's an investment that returns substantial dividends whether you ever have a fire or not.

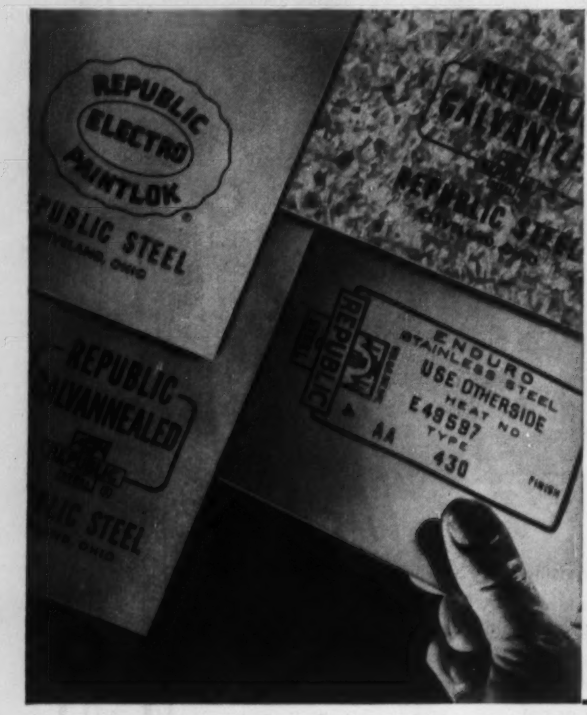
Let us show you how!

What's worth insuring is worth protecting!

"Automatic" Sprinkler
CORPORATION OF AMERICA
YOUNGSTOWN, OHIO

Offices in Principal Cities of North and South America

These 4 Big Advantages when you fabricate with


REPUBLIC
ELECTRO
PAINTLOK
UBLIC STEEL
EVELAND, OHIO
REPUBLI
GALVANIZ
REPUBLIC STEE
REPUBLIC
GALVANNEALED
LIC STEEL
REPUBLIC
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STAINLESS STEEL
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FINISH

REPUBLIC MAKES A VARIETY OF SHEETS

Whatever the requirement, fabricators find Republic Steel Sheets ideal for a wide variety of applications.

Republic Galvanized—with a steel or copper steel base—is highly ductile, easily bent, flanged, or otherwise fabricated. Its tight zinc coating assures years of trouble-free service.

Republic Galvannealed—with a steel or copper steel base—will take paint and lacquer without preliminary treatment. The spelter coating adheres tightly to the base metal, will not flake or peel. It's ideal where product is exposed to severe weather.

Republic Enduro® Stainless Steel—offers more advantages than any other commercial metal. It resists rust and corrosion—is attractive and easy to clean. It's tough, strong, and resists heat. And it can be fabricated on your present equipment. We will be glad to furnish additional facts promptly.

REPUBLIC STEEL CORPORATION
3120 East 45th Street
Cleveland 27, Ohio

Please send additional information on:

- ☐ **Republic Electro Paintlok Sheets**
- ☐ **Republic Galvanized Sheets**
- ☐ **Republic Galvannealed Sheets**
- ☐ **Republic Enduro Stainless Steel Sheets**

Name ____________ *Title* ____________

Company ____________

Address ____________

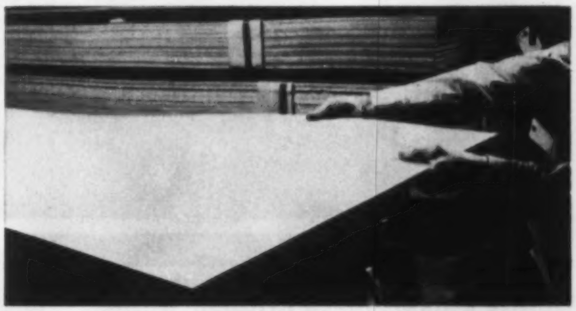
City ____________ *Zone* ____ *State* ____________

K-9654

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

will save you money
Republic Electro Paintlok



1

NO STORAGE RUST

Thanks to a combination of electro-galvanizing and a special paint-bonding chemical treatment, Republic Electro Paintlok sheets may be stored for long periods of time under approved warehousing conditions without damage due to rusting. An adequate inventory can be maintained to avoid costly shutdowns during peak periods. And you save in reclamation work or actual loss from unusable sheets.

2

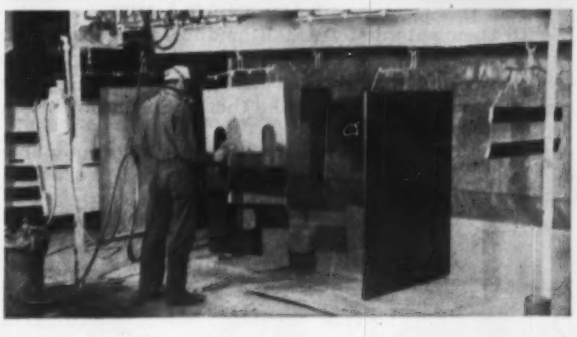
MINIMUM CLEANING COSTS

Degreasing Republic Electro Paintlok sheets is unnecessary when no drawing compound is used. They come in prime condition for painting. Only the removal of fingermarks, fabricating oils and any dirt acquired during warehousing and fabrication is necessary. Surfaces are pre-conditioned. No pre-etching is required. And because they are cleaner to handle, employees like to work with them.

3

LOWER PRODUCTION COSTS

The ability of Republic Electro Paintlok's zinc coating to remain absolutely tight during drawing, bending, rolling, shearing and punching operations—with no fracturing, no cracking, no peeling or flaking—speeds production and lowers costs. Uniformity of gage—plus increased die life due to the lubricating quality of the coating—make further economies possible. Ask any of our customers about these important advantages.



4

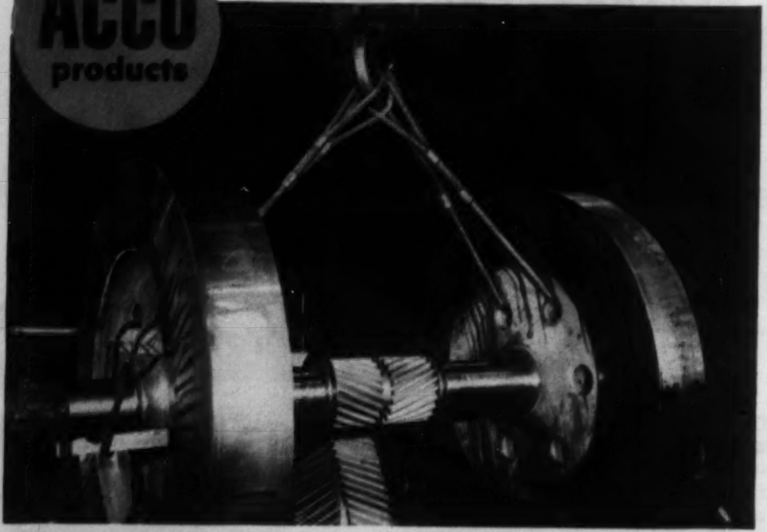
MAXIMUM PAINT ADHERENCE

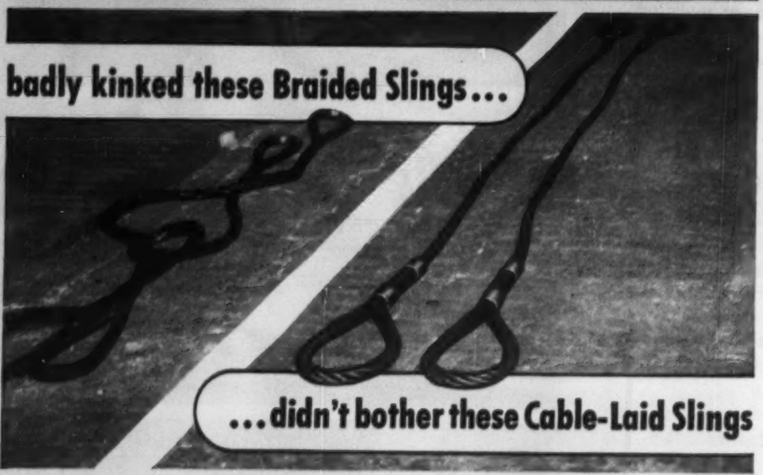
Republic Electro Paintlok is zinc-plated and chemically treated to take paints, lacquers, synthetic enamels—and hold them for years through hard service and severe exposure. The inert, finely crystalline, nonmetallic phosphate coating is highly absorbent in character, grips the paint with thousands of tiny "teeth" that never let go.

To save money and produce painted or enameled steel products that look better longer—it will pay you to get the complete facts on Republic Electro Paintlok.

ACCO
products

This 34-Ton Load...




badly kinked these Braided Slings...
...didn't bother these Cable-Laid Slings

Here's Why:

Because these ACCO *Registered* CABLE-LAID slings combine the flexibility of manila rope with the strength of steel.

The secret of the CABLE-LAID sling is in the construction of the rope. It's a combination of six wire ropes laid around a special steel center to give you a rugged steel body which has:

- **Freedom from Crankiness**
- **Extreme Flexibility**
- **Resistance to Kinking**

With their patented DUALOC endings these CABLE-LAID slings are tops in ease of handling . . . resist abuse . . . and give you longer sling life which reduces lifting costs. And these slings are ACCO *Registered*—with all the advantages that make this specification the standard of efficiency and safety.

See your ACCO Registered distributor or write our Wilkes-Barre, Pa., office today

ACCO

Wire Rope Sling Department
AMERICAN CHAIN & CABLE

TRADE MARK

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Bridgeport, Conn. • In Canada: Dominion Chain Co., Ltd., Niagara Falls, Ont.

for Better Value

(*Concluded from page* 115)

treasurer, Louis Draves, Ternstedt Division, General Motors Corp., Flint, Mich.; librarian-historian, F. S. Marr, Detroit Mold Engineering Co., Detroit; trustee, Harry H. Hirsch, C. M. Hall Lap Co., Detroit.

REPRESENTATIVES

Industrial Lift Truck Co., Philadelphia, has been appointed to sell and service the line of fork-lift trucks, powered hand trucks and straddle carriers manufactured by **Industrial Truck Division, Clark Equipment Co.,** Buchanan, Mich.

Berry Bearing Co., authorized stock-carrying distributor for 41 bearing and bearing specialties manufacturers, opened a new store at 6923-25 W. Archer Ave., Chicago 38, Ill.

Lamson Mobilift Corp., Portland, Oreg., appointed the following dealers for its line of fork lift trucks: Modern Handling Co. Inc., Indianapolis; Dechert Machine Shop Inc., Palmyra, Pa.; Reagan Equipment Co., New Orleans and Natchez, Miss.; Bigelow Robinson Co., Little Rock, Ark.; Stanly Handling Equipment Co., Agawam, Mass.; and F. H. Ross & Co., Charlotte, N. C.

Service Steel Division, Van Pelt Corp., Detroit, appointed R. T. Mills as its sales agent in the Cleveland area.

Greer Hydraulics Inc., Jamaica, N. Y., appointed Hydro-Air Inc., St. Louis, as distributor of its hydropneumatic accumulators and other hydraulic products.

Kaiser Aluminum & Chemical Sales Inc., Oakland, Calif., appointed Hawkridge Bros. Co., Boston and Waterbury, Conn., and L. E. Zurbach Steel Co., Somerville, Mass., as distributors of its aluminum products.

Moriarty & Zahner, Los Angeles, industrial consultants, were appointed to represent **Transue & Williams Steel Forging Corp.,** Alliance, O., in the West.

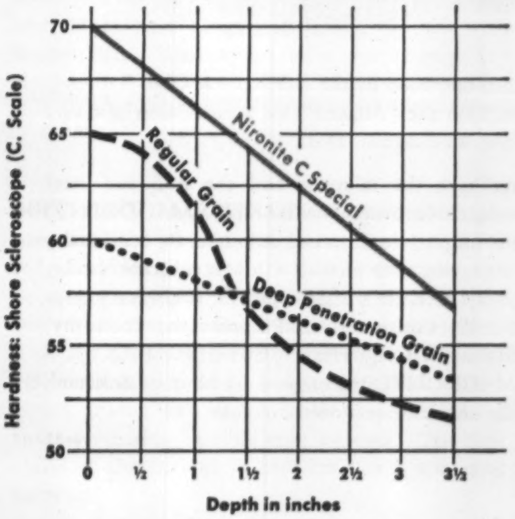
TIPS FROM A ROLL MAKER'S NOTEBOOK

MACKINTOSH-HEMPHILL DIVISION, E. W. BLISS COMPANY, Pittsburgh 3, Pennsylvania

Cast mill rolls • Johnston cinder pots • rotary tube straighteners • end-thrust bearings • heavy-duty lathes • steel and special alloy castings

How to pick rolls for bar and billet mills

The crux of the problem—Roughing a pass in a roll for a bar mill.



Generalized curves show how hardness decreases below the surface of three types of roll.

Like all rolls, those for the intermediate and finishing stands of bar and billet mills must possess the best possible balance of strength-vs.-hardness. However, they cannot be chosen on this basis alone.

The problem is complicated by the shape and depth of the passes. Many rolls must be cast plain because of the size of the passes or because of the roll user's need for plain rolls which may be turned for any section. Hence, large amounts of metal must be removed during turning.

As a result the metallurgist strives for two prime objectives in rolls for these applications. They are (1) the greatest possible depth of hardness and (2) fine grain structure to provide smoothness of work surface at the bottom of the passes.

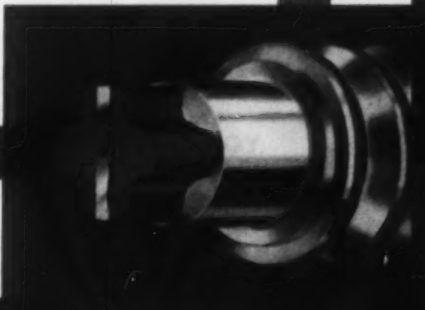
A practical solution—The Nironite C Special roll is the answer that Mack-Hemp has developed to meet this problem. In this indefinite chill nickel-chromium alloy iron roll, depth of penetration is achieved by careful control of the carbon content. This results in deep penetration as well as less and finer graphite in the solidified iron. Hardness decreases very gradually as distance from the surface increases (see graph at left). Thus, this manipulation of carbon provides excellent wear resistance even at the bottom of deep passes. And the low graphite content which is assured by this special composition provides excellent surface condition at depths well below the original surface.

Nironite C Special rolls are only one example of the way Mack-Hemp can combine metallurgical research with nearly five generations' experience in the "art" of roll making to improve the performance of modern rolling mills. For help with your special rolling problem, write us today.

MACKINTOSH-HEMPHILL

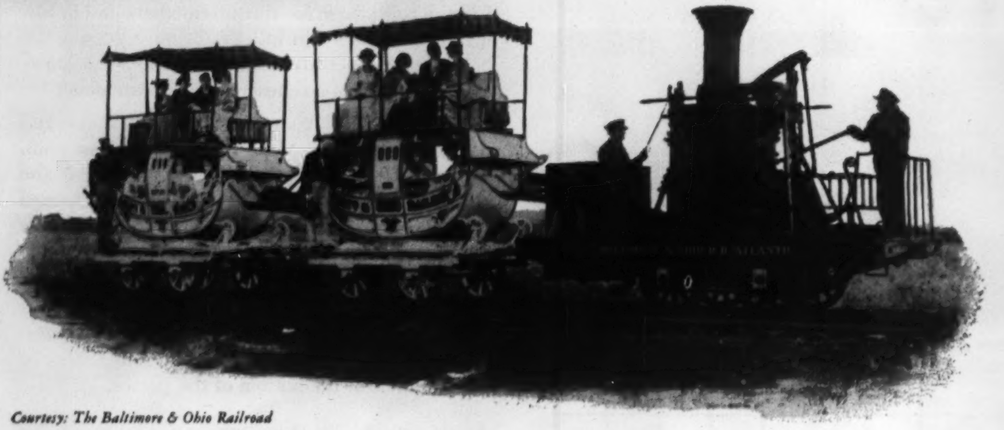
You get more tonnage from the rolls with the Striped Red Wabblers

DIVISION OF **E. W. BLISS COMPANY**



FAMOUS FIRSTS IN THE IRON & STEEL INDUSTRY

HAND IN HAND THEY GREW...



Courtesy: The Baltimore & Ohio Railroad

As the need for heavier railroad rails grew, so did the iron industry. The first railroads began with wooden rails which were iron-topped. It was not until 1844 that "heavy", entirely iron rails went into production at the Mt. Savage Rolling Mill in Allegheny County, Maryland. It was 21 years later, in 1865, when the first steel rail was rolled from a Bessemer ingot at the North Chicago Rolling Mill Co.

One of the first "iron horses" to snort flame, belch smoke and cinders, and scare livestock was the "Atlantic". Built in 1832 by Phineas Davis in York, Pennsylvania, the "Atlantic" was placed into operation by the Baltimore & Ohio Railroad. In 1835 the "Atlantic" led a procession of trains into Washington, D. C.

As have the railroads and the iron and steel industries grown, so has BAKER'S MAGDOLITE, the original dead-burned dolomite. By continually improving their product through constant testing, today BAKER'S MAGDOLITE is always 5 ways better: Composition, Preparation, Economy, Strength, Quality. Specify BAKER'S MAGDOLITE, the original dead-burned dolomite, the next time you need dolomite.

6-55

ANOTHER FAMOUS FIRST

JEBCO
PRODUCTS
SINCE 1889

BAKER'S MAGDOLITE

The original dead-burned dolomite

THE J. E. BAKER COMPANY

YORK, PENNSYLVANIA • PLANTS: BILLMEYER, YORK, PENNSYLVANIA • MILLERSVILLE, OHIO

STEEL

December 5, 1955

Technical Outlook

DEOXIDATION PRACTICE— A comparison of calcium-silicon and ferrosilicon deoxidation for E4340 steel shows that calcium-silicon gives fewer and usually shorter Magnaflux indications throughout the heat. That's what A. F. Sprangle, metallurgical engineer, Timken Roller Bearing Co., told the AISI at Philadelphia. A difference in inclusion types suggests an explanation. The calcium-silicon heat has more of the complex, globular-type inclusions than ferro-silicon heats. They show less tendency to elongate with hot-work reduction.

COOL GRINDING WHEELS— Lightweight cellular glass fragments that break under impact give a new approach to pore spacing in resinoid grinding wheels at Electro Refractories & Abrasives Corp. Previously such pores were formed by putting in naphthalene or other filler materials that evaporate in the wheel. The new method is said to give grinding wheels with longer life. High speed does not change the temper of metal being ground because the operation is fairly cool.

SUPERCRITICAL—At 1150°F and 4500 psi pressure, the newest steam turbine and boiler for the Philo plant of the Ohio Power Co. will be operating in the range where designers have feared to tread. To handle the supercritical heat and pressure, both turbine (GE) and boiler (Babcock & Wilcox Co.) are of radical design. Boiler tubing and steam lines were welded by the consumable backing ring process. The first stage of the turbine is contained in a spherical housing.

HIGH TEMPERATURE COATING— A flame-sprayed, nickel-magnesium-oxide, cermet coating is resistant to temperatures of 2000°F under oxidizing conditions, reports O. Hommel Co., Pittsburgh. Thermal shock resistance at this temperature is good. The coating has high insulating value. A thickness of 15 to 20 mils gives as much as a 700°F differential in temperature of the coated and uncoated sides of metal parts.

SAVINGS STICK—The Ternstedt-Trenton plant of GM ships parts in a glued-together carton stack that eliminates strapping. Cartons in the first layer are glued to a pallet and covered with a common lid. The next layer is glued to the lid, and so on up the stack. When the stack is broken down, the bottom cartons are left stuck to the pallet and re-used.

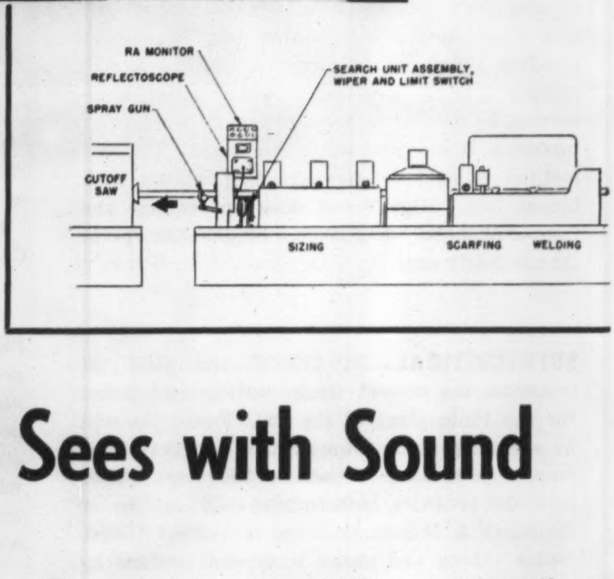
CARBIDE COAT—Tungsten carbide coatings are made by sintering powders, by flame plating, by gas plating, by flame spraying. Carboloy says it has another method, which will put an 0.030-in. carbide coat on such steel items as drill jig bushings and cylinder linings. A "truly" sintered carbide structure is the way Carboloy describes it.

PERFECT METALS—Several years ago GE grew perfect crystals of iron. Now it has come up with six more—gold, silver, platinum, copper, nickel and cobalt, formed from the gaseous state. Pure copper crystals, tensile tests show, will withstand stresses of 600,000 psi. If bent and then heated, the crystals (in the form of whiskers) return to their original shape.

CONCENTRATED POWER—Two 83,000 hp motors—said to be the most powerful in the world by Westinghouse, their builder—will drive a 3800 mph gale in the new supersonic wind tunnel at the Air Force's Arnold Engineering Development Center, Tullahoma, Tenn. The 122-ton rotors spin at 600 rpm. Compressor blades (almost two-thirds of a ton each) are solid forgings rooted to discs.

Metalworking Outlook—p. 75 Market Outlook—p. 173

Weld inspection on the tube forming line at Saginaw Steering Gear



By LEO J. ADAMS
Metallurgist, Saginaw Steering Gear Div.
General Motors Corp.
Saginaw, Mich.

Weld Inspector Sees with Sound

ULTRASONICS is at work catching weld defects on a tube mill at Saginaw Steering Gear Division, GM. Horns blow, lights flash, air hisses, paint sizzles: The electronic system has taken over tedious mechanical inspecting chores, and is doing a better job.

The SAE 1020 tubing inspected at Saginaw is 3 in. OD with 0.065-in. walls. It is formed and resistance welded continuously from strip stock on an Etna, UK 30 tube mill equipped with a 180-cycle resistance welder. The product is used in the manufacture of automobile propeller shafts.

Eagle Eye — Ultrasonics has made continuous weld inspection possible. Each defect in the weld is marked as it comes off the mill. Poor welds caused by improper adjustment, laminations, etc., are brought to the attention of the operator by a signaling horn.

Immediate detection makes possible prompt adjustment, reducing scrap loss. Instantaneous marking assures 100 per cent inspection at speeds up to 100 fpm.

Reflectoscope—The detecting device is an ultrasonic reflectoscope manufactured by Sperry Products Inc. Basically, it is a pulse generator which sends electrical oscillations to a quartz transducer. The transducer converts the electrical oscillations into mechanical vibrations and transfers them to the material being tested by contact through a coupling agent.

These vibrations travel in a

straight line until they reach a dissimilar material which may either be the end of the piece or a discontinuity. They are reflected back into the transducer. The transducer converts all reflected vibrations back into electrical oscillations and sends them back to the reflectoscope.

The reflectoscope amplifies the electrical oscillations. A sweep circuit translates them to a cathode ray tube screen where they show up as pips, which indicate the size and location of defects.

Crystal — The transducer used by Saginaw Steering Gear is a 1 megacycle, X-cut quartz crystal set in a plastic wedge at an angle to generate surface waves in the material being tested. The crystal is spring mounted in contact with the tubing at an angle of 120 degrees from the weld bead, to eliminate initial pulse interference.

When no defects are encountered by the generated wave, it travels 360 degrees around the tubing back to the crystal. As a result, a pip is shown on the reflectoscope screen 360 degrees from the initial pulse. If a defect is encountered at the weld, a portion of the surface wave is reflected back to the crystal, and a pip appears on the reflectoscope screen at a point 240 degrees from the initial pulse (120 degrees to the weld and 120 degrees back to the crystal).

Gates—Locating the defect on the reflectoscope screen is made easier by superimposing gates over the pip representing the weld area. A gate is an electronically created jog in the reflectoscope trace (see sketch below).

A Sperry recording and signaling device identifies and measures the amplitude of defects at the weld zone. They are permanently recorded on a Brush recorder.

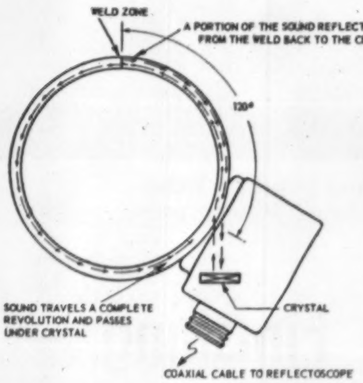
Measuring the size of the defect and marking defective tubing are done by a signaling circuit within the gated area. When this circuit is triggered, a 6.3-volt signal actuates a signal light, horn and solenoid-operated air valve. The valve supplies air to a spray gun which paints the defective section of tubing.

Old Way—Before ultrasonic inspection a four-step test procedure was followed:

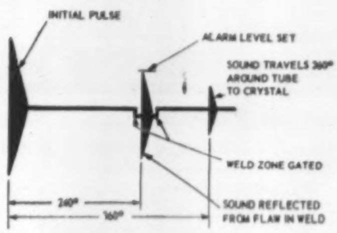
1. A 5 per cent minimum expansion test determined the ductility of the weld and tube. 2. A torsion test was used to determine ultimate strength. 3. A fatigue test simulating the most severe field conditions determined service life. 4. Each tube was checked 100 per cent hydrostatically for quality of weld.

New Look—Two months of extensive ultrasonic testing revealed that: 1. Every sample and all production during this period failing the 5 per cent expansion test were also rejected by the reflectoscope. 2. All tubing rejected by the reflectoscope and assembled into automobile propeller shafts for test purposes failed the fatigue test. No shaft passed by the reflectoscope failed. 3. Some types of failures rejected by the reflectoscope passed the hydrostatic test, but no tubing which passed by the reflectoscope failed the hydrostatic test.

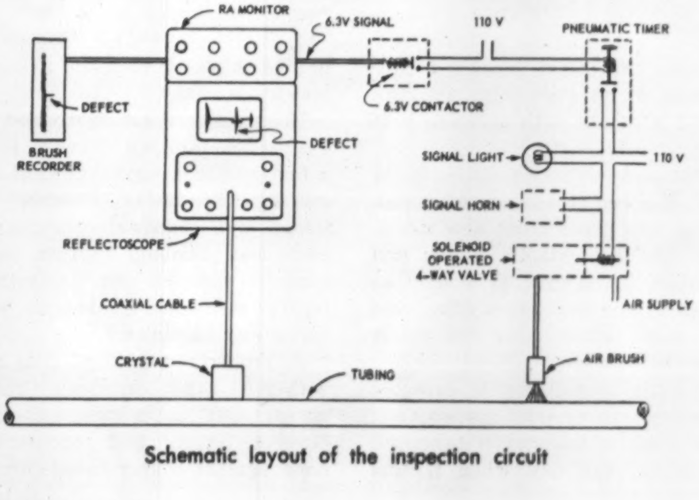
The conclusion: Ultrasonic inspection is either as good or better than all tests previously used. The ultrasonic method was incorporated into the manufacturing process, and mechanical tests (with the exception of the expansion test) are now used only for occasional spot checking.


WELD ZONE
A PORTION OF THE SOUND REFLECTS FROM THE WELD BACK TO THE CRYSTAL
120°
SOUND TRAVELS A COMPLETE REVOLUTION AND PASSES UNDER CRYSTAL
CRYSTAL
COAXIAL CABLE TO REFLECTOSCOPE

The crystal that sees through steel


INITIAL PULSE
ALARM LEVEL SET
SOUND TRAVELS 360° AROUND TUBE TO CRYSTAL
WELD ZONE GATED
SOUND REFLECTED FROM FLAW IN WELD
240°
360°

Cathode ray tube display


RA MONITOR
6.3V SIGNAL
110 V
PNEUMATIC TIMER
DEFECT
BRUSH RECORDER
6.3V CONTACTOR
DEFECT
SIGNAL LIGHT
110 V
SIGNAL HORN
REFLECTOSCOPE
SOLENOID OPERATED 4-WAY VALVE
COAXIAL CABLE
AIR SUPPLY
CRYSTAL
TUBING
AIR BRUSH

Schematic layout of the inspection circuit

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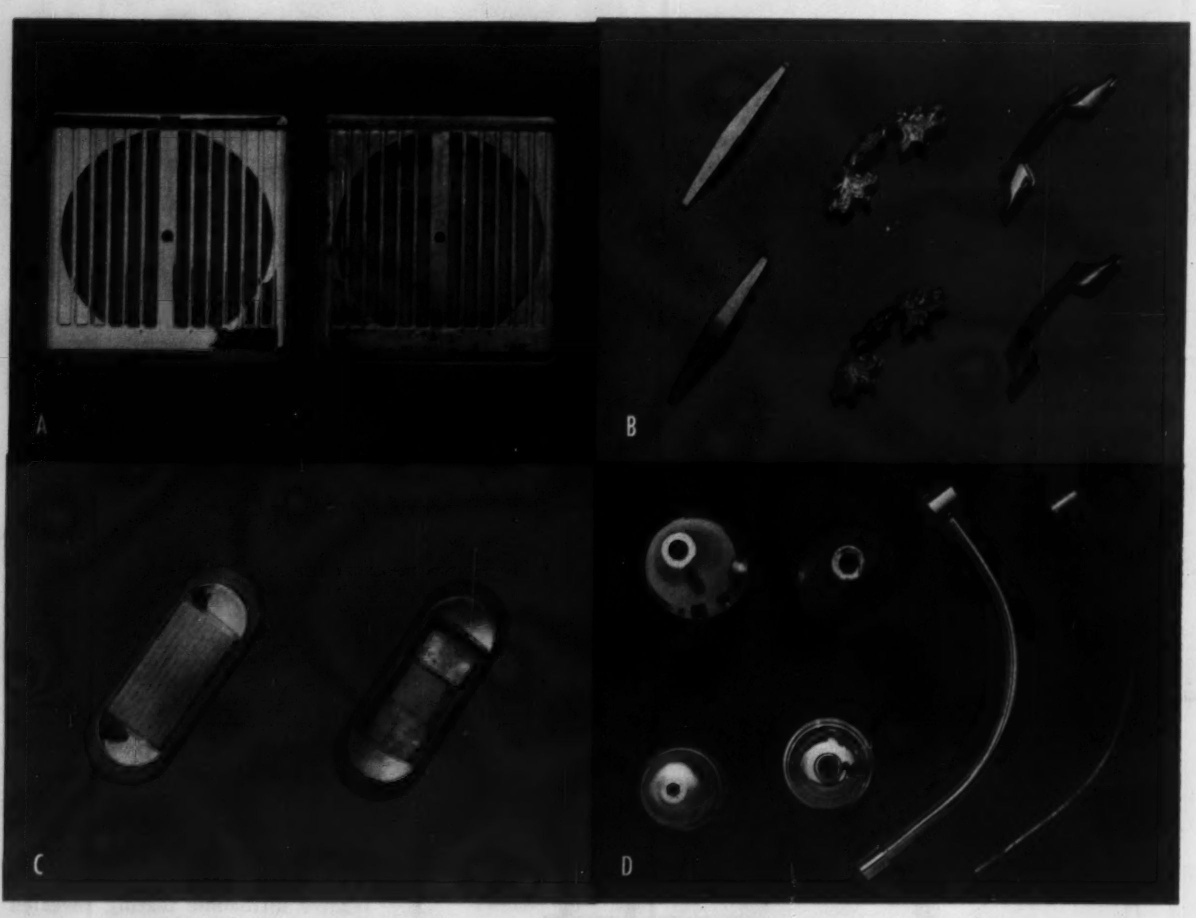

Look for vacuum metallizing on metal parts like these: A. Stamped grille for a kitchen fan. B. Die-cast drawer pulls. C. Die-cast automobile dome lights. D. Lamp parts

Lacquer Boosts Vacuum Finishing

By J. GORDON SEITER
Manager, High-Vacuum Division
F. J. Stokes Machine Co.
Philadelphia

AFTER 150,000 openings, the brass plated knob on one side of the factory door was worn to the base metal. The metallized and lacquered knob on the other side looked good as new.

Two years ago the metallized knob wouldn't have stood a chance. To appreciate the difference, you have to look at the lacquer.

It forms both base and topcoat for the metal film: Base, because the lacquer makes an ultrasmooth finish—the metal deposit reproduces exactly the surface on which it is deposited. Topcoat, because the metal deposit, 5 millionths of an inch thin, wouldn't stand a chance with abrasion if it weren't protected.

Prospects—There's little doubt that the recent success of metallizing has come from new developments in synthetic resins and lacquers. The process is only as good as the protective films, and the wear resistance of the newer films is excellent.

Vacuum metallizing is expected to move into applications where it has been considered impractical. Certainly, the day when it was limited to plastic toys and costume jewelry is past.

Electroplaters are interested in vacuum metallizing because it is a fast and inexpensive method for putting decorative finishes on items like hardware, appliance parts and plumbing fixtures. It is ready to compete with electroplating for resistance to abrasion, salt spray and humidity.

A properly metallized film has withstood the standard Taber abraser test, outwearing a copper-chrome finish, and comparison tests against copper-nickel-chrome finishes are being made now.

Capital Outlay—Vacuum metallizing units are available from $12,000 to $30,000. Baking ovens, lacquering equipment, trucks, racks and jigging fixtures mean an additional investment of $5000 to $10,000. The capital outlay for a complete setup: From $17,000 to $40,000.

If you want to go all out, you can add automatic conveyors, infrared ovens and automatic spray equipment. Floor space requirements vary from 2500 to 5000 sq ft for efficient operation.

Unskilled Labor — Because unskilled labor does the work, finishing costs represent a considerable saving over those of electroplating where hand buffing and polishing are required. It takes a green operator only a couple of days to learn to operate the unit.

Each evaporation uses about 10 cents worth of aluminum wire, enough to coat 5000 pieces of costume jewelry. Tungsten filaments cost about $8 per set and last for eight to ten "shots." Lacquer averages out to 25 or 30 cents per spider. (A spider is the fixture on which parts are racked for metallizing.)

As a result, cost of finishing one load is $2 to $3 for material. The main cost is labor for racking the pieces.

Within Limits—Of course, there are many applications where vacuum metallizing will never replace electroplating — automobile bumpers, for example. While the coatings are tough and durable, they can be gouged with a sharp edge and chipped by severe impact.

Aluminum diecastings are another problem. The base coat of lacquer tends to be absorbed into the diecasting with the result that it makes a rough finish. Diecastings need two or three coats for a glossy base. Powdered metal parts raise the same objection.

Color—Highly polished chromium, nickel or brass plated finishes are easy without hand buffing and polishing, and possibilities for color finishes are unlimited. The top coating or lacquer can be pigmented to simulate gold, brass, copper, etc.

Other colors are possible by dye dipping. The main objection to this method is that after several months of exposure to direct sunlight, the piece will fade.

Color Differential—Fading can be stopped by using pigmented top lacquers, but then recessed areas are likely to accumulate a heavier coating than the smoother areas. This will result in a color differential.

The nearest approach to color toning requires a single wipe of a cloth on the aluminized film immediately after evaporation. The toning effect, when covered with the top coat of lacquer, simulates hand toning of electroplated finishes.

Other Metals—Although aluminum is most common for the metallized film, other metals can easily be melted and evaporated. Aluminum is the only metal which will conveniently wet a tungsten filament, so to evaporate copper, gold, silver, etc., a molybdenum trough or boat is used to hold the metal. Resistance heating brings the boat to incandescence.

With this arrangement, the fixtures holding the parts have to be revolved on a planetary system so that each spider eventually will pass over the evaporation source. The vapors will not travel downward when the molten metal is in the trough.

The Latest — Recent developments in vacuum equipment for metallizing are faster pumps and larger chambers. A 6 ft diameter chamber, 5 ft long, can be pumped down to a vacuum of ½-micron within 7 minutes. For job platers and small processing plants, there is low-cost equipment stripped of refinements for semivolume production.

Vacuum metallizing of copper on nonconductive surfaces makes a base for electroplating. Vacuum metallized film can be bonded to vinyls or steel sheet and then embossed or stamped to get beautiful decorative effects.

Lacquering Technique for Vacuum Metallizing

Vacuum metallized films are so thin they exactly reproduce the surface on which they are deposited. An almost perfect lacquer surface is necessary: 1. Below the metal film to prevent outgassing and fill in mold defects. 2. On top of the metal film to protect it from abrasion. There can be no runs, orange peel, sags, dry areas.

Several techniques to get perfect lacquer coating are in wide use:

1. **Spraying**—Hand spraying requires considerable skill. Electrostatic spraying is excellent although there are disadvantages if the shape of the piece is such that the lacquer will not reach all surfaces.

2. **Dipping**—Success requires either slow withdrawal of parts from the lacquer tank to eliminate runs, or fast withdrawal followed by spinning to remove excess lacquer and slow rotation to even out runs.

3. **Flow Coating**—Parts are first mounted on spiders, which then are mounted in a horizontal tank containing 2 or 3 gallons of lacquer.

The spider is slowly rotated while the clean lacquer cascades over the parts to be coated. After the parts are thoroughly washed with filtered lacquer, the spider is spun rapidly to remove the excess lacquer.

The entire spider is then transferred to a rotator which revolves it at 8 to 10 rpm for a 10 to 15 minute air dry. This evens out lacquer runs.

4. **Baking**—The lacquer coats must be baked. Baking time depends on the base material. With metals, it is usually ½-hour at 300° F.

5. **Dyeing**—After the top coat of lacquer has been baked for 10 minutes, parts may be given a few seconds' dip in a water-soluble dye. After dyeing, the parts, still mounted on the spider, are rinsed in water, then in a mild detergent to eliminate water spots. They are returned to the baking oven to set the color.

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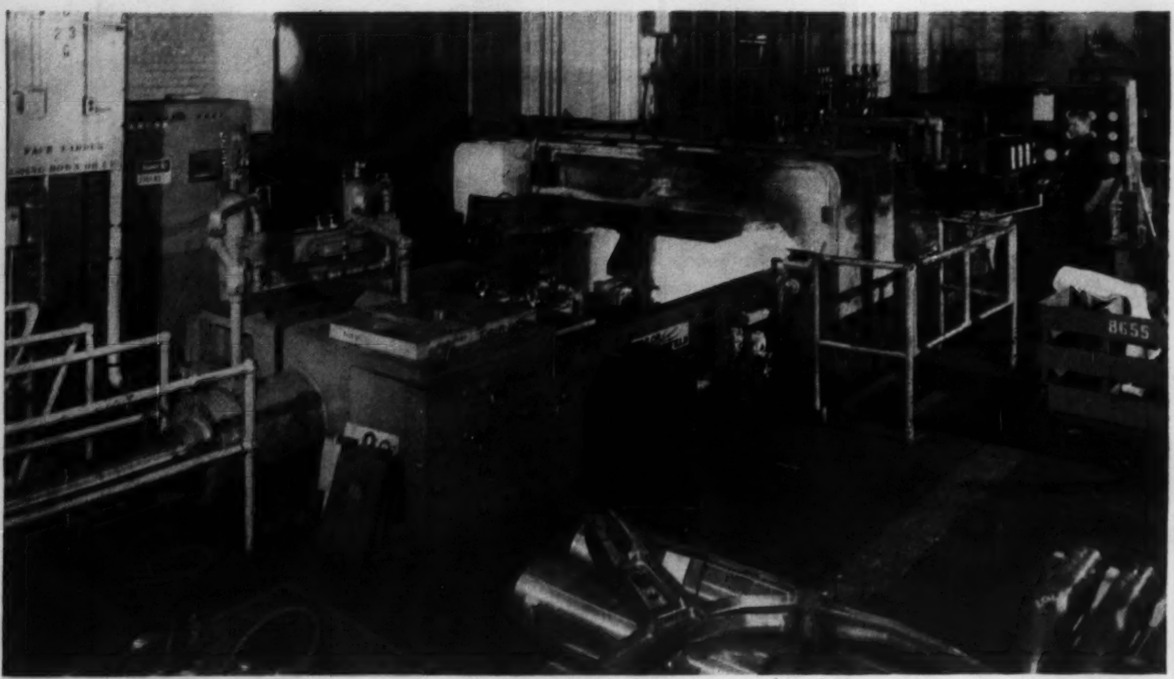


Fixtures and filler blocks adapt this outsized butt flash welder for a variety of uncommon shapes

Tooling with a Future

Production economy for aircraft parts is sired by utility for today's job with adaptability for tomorrow

By FRED EVANS
Asst. Master Mechanic
Cleveland Pneumatic Tool Co.

TEN YEARS AGO aircraft landing gears were made of multiple parts that could be readily machined on standard tools.

Today, many of these parts are of one piece or butt-flash-weld design and frequently require special machine tools for manufacturing.

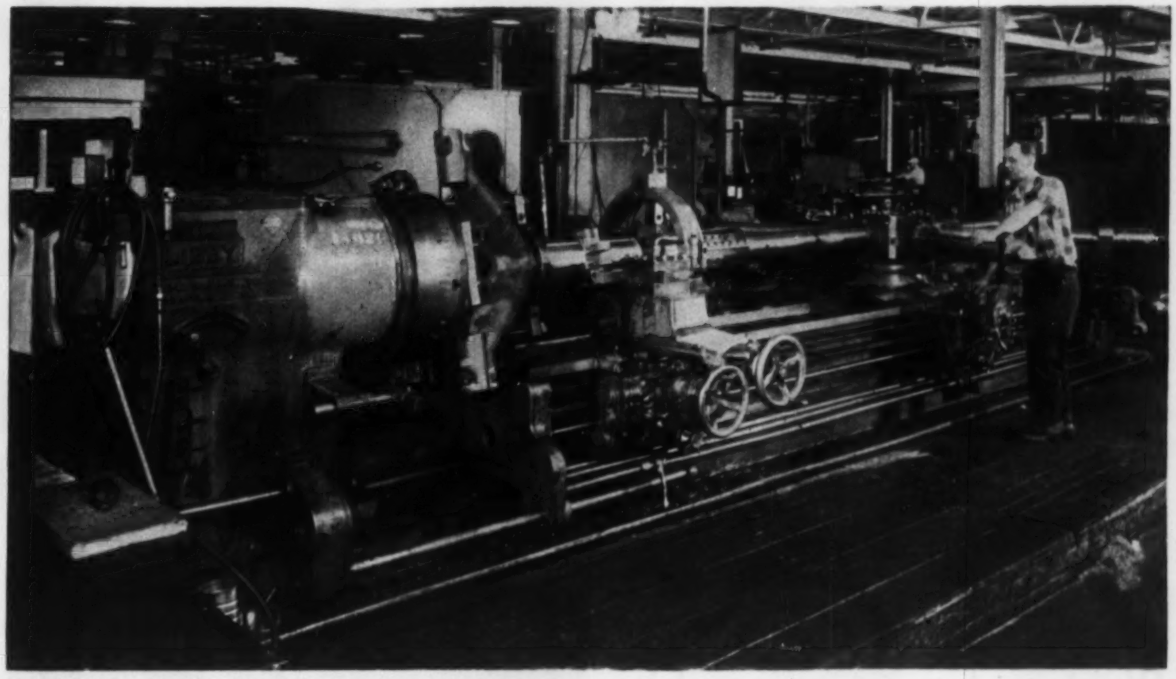
This constant change in landing gear design is a perennial problem. Special machinery and tools often can't be justified for such jobs because of low volume. Nor are standard tools always flexible enough to take the variety of odd shapes and large sizes.

It Can Be Done—Cleveland Pneumatic Tool combines a maximum of standard equipment with a maximum of special attachments to whip the problem. Gap-type turret lathes, wood pack boring, hydraulic or air tracer attachments, butt welders in place of hand arc welding, a special machine with adapters for a wide variety of parts—all balance production with economy of initial costs.

Gap-Type Turret Lathes — Not often found in production, this type machine can turn a wide variety of sizes, shapes. Often the part can be mounted on the turret and the chuck used to turn the tool, as in a boring mill. A mounting fixture is the only special part that requires change.

Some parts require internal, profile boring. Tracer attachments are used for this, as well as boring and internal and external grinding. Results show a 300 per cent improvement over the former, conventional method.

Wood Pack Boring—An old shop practice brought up to date uses hard maple strips as guides for a boring bar. The secret is a heavy flow of cutting fluid, 300 psi, to clear the chips completely. Result: A bore that is accurate



Wood pack boring produces a finish that is close enough to hone. Secret is a high volume of lubricant to clear chips

enough to hone immediately and eliminates an intermediate grinding operation.

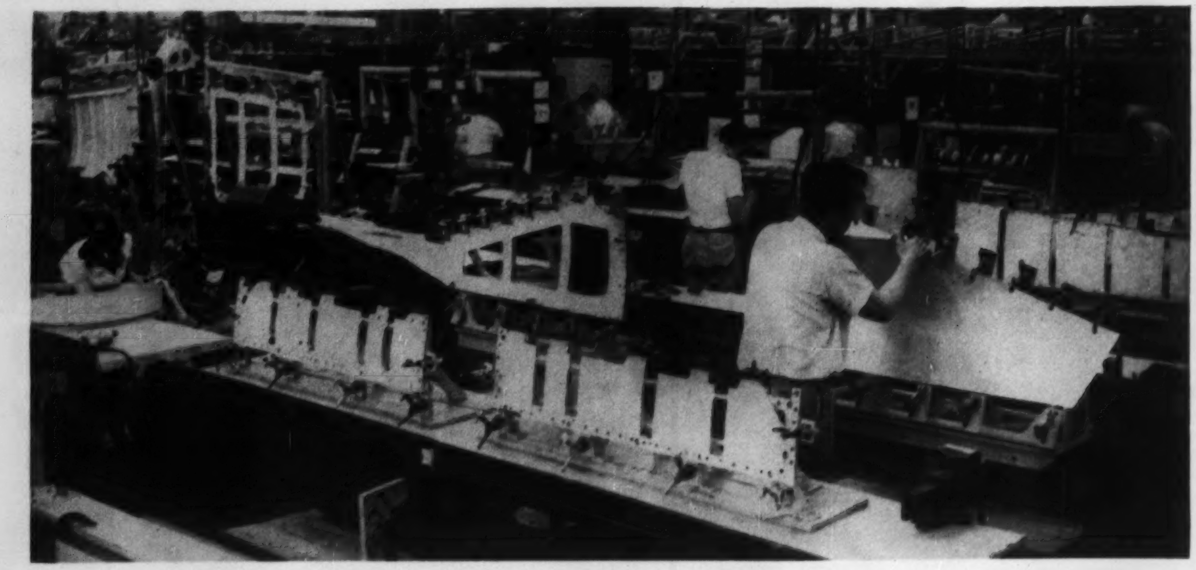
Adaptable—Where special machinery is the only practical solution, every effort is made to provide adjustable, interchangeable features. One such machine uses four, individually powered, adjustable machining heads. The work is attached to a transfer fixture that can be moved through the three stations. Only the fixture needs to be changed to accommodate new designs.

Parts that used to be manually arc welded due to size are now being butt flash welded in a 1600 kva butt flash welder. This welder can accommodate alloy steel parts up to 18 in. in diameter and 67 sq in. cross section. Aircraft specifications were met, production improved 100 per cent, scrap forced down 70 per cent.

Such a large butt welder—a million pounds of upset force can be applied—might fall into the category of a special machine. But care in design satisfied versatility with a big bed to accept large or small parts.

Invention—Don't overlook invention in your own shop to adapt standard machinery to meet production needs. We modified a standard boring machine by stripping off the worktable and substituting one of our own design. The new table resembles one for a vertical lathe. An indexing type, each stop is adjustable. T-slotting allows an infinite number of positions for a fixture. With this modification, a specialized boring mill becomes a flexible production machine that will meet today's demands for conservation.

Shop inventiveness produced this indexing rotary table for a standard boring mill. If part specifications change, only the fixture is affected



Aluminum door panels for the fuselage skin are assembled on production lines with lightweight fixtures made from a laminate of epoxy tooling plastics and Fiberglas cloth

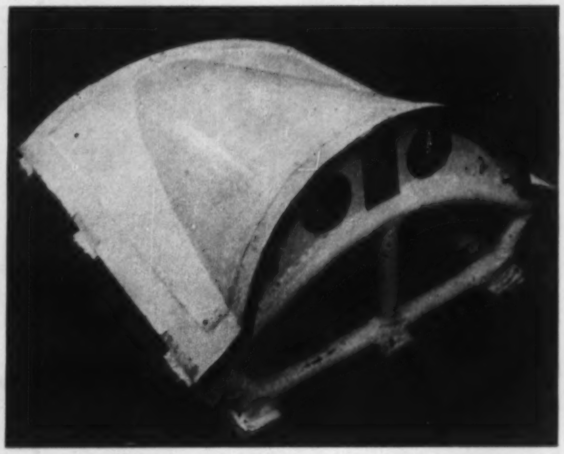
Plastics Speed Assembly

BUILDING a turbojet fighter like the Air Force's Voodoo calls for a large number of tools, jigs and fixtures to maintain tolerances and assure perfect fits.

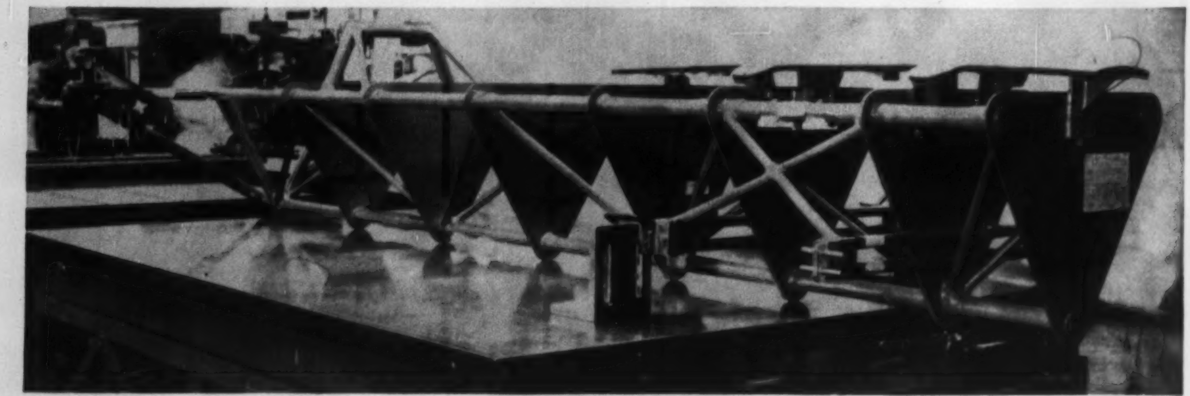
McDonnell Aircraft Corp., St. Louis, found it could cut make-up time and costs about 40 per cent with plastic tools. The company uses a tooling compound developed by Ren Plastics Inc., Lansing, Mich., which is based on Bakelite epoxy plastic.

Lightweight—Dimensionally stable, the epoxy materials resist moisture, changes in temperature and humidity, as well as wear and abrasion. The plastic tools are about 75 per cent lighter than comparable metal tools.

The many tools needed to check, rivet and assemble a single part are quickly duplicated and reduplicated from master models surfaced with plastic.



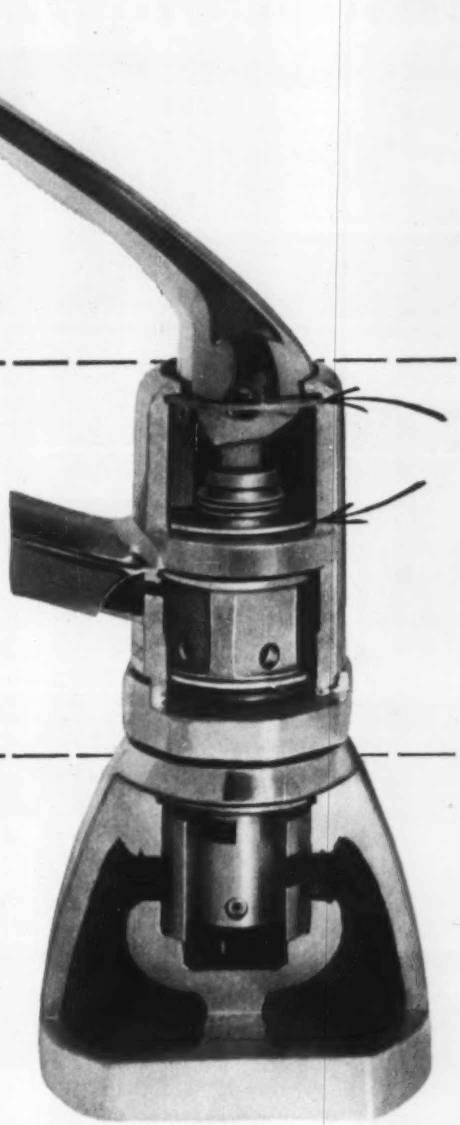
Voodoo door panels are contoured to the shape of this plastic template. A second, female template completes the set. The tubular frames are also epoxy laminate



Epoxy laminates and reinforced epoxy tubing for the frame form a large inspection fixture for a Voodoo fuselage section at about one-fourth the weight of a steel tool

Look into REVERE Phosphor Bronze

– it pays RAVENNA to use it!



Moen Single Handle Mixing Faucet, made by Moen Valve Co., Division of Ravenna Metal Products Corp., 6518 Ravenna Ave., Seattle 15, Wash.

This Moen Single Handle Mixing Faucet contains an anchor disc and an anchor washer, both stamped out of Revere Phosphor Bronze Strip. These are small parts, but in a fine product such as this faucet, high quality metals must be used throughout. Here is a condensation of the manufacturer's experience with the phosphor bronze:

Anchor Disc: •Standard punching speed maintained. •No pre-straightening off the arbor for the automatic punching process. •No excessive die wear. •Corners are sharp and clean; no de-burring needed. •Natural mill finish is better than they could achieve by tumbling or burnishing. •High tin content means no lubrication is required; they call it "silent brass."

Anchor Washer: •Have not had a single surface failure. •Dry tumble to de-burr. •Good fatigue characteristics and no obvious signs of corrosion.

Revere offers several types of phosphor bronze, each with slightly different characteristics. In addition to this alloy, Revere also supplies Ravenna with round and octagonal leaded brass tube and free-cutting brass rod, for use in various parts of the valve. We will be glad to collaborate with you on selection of just the right forms of the correct alloys for your products, present or projected. See the nearest Revere Sales Office.

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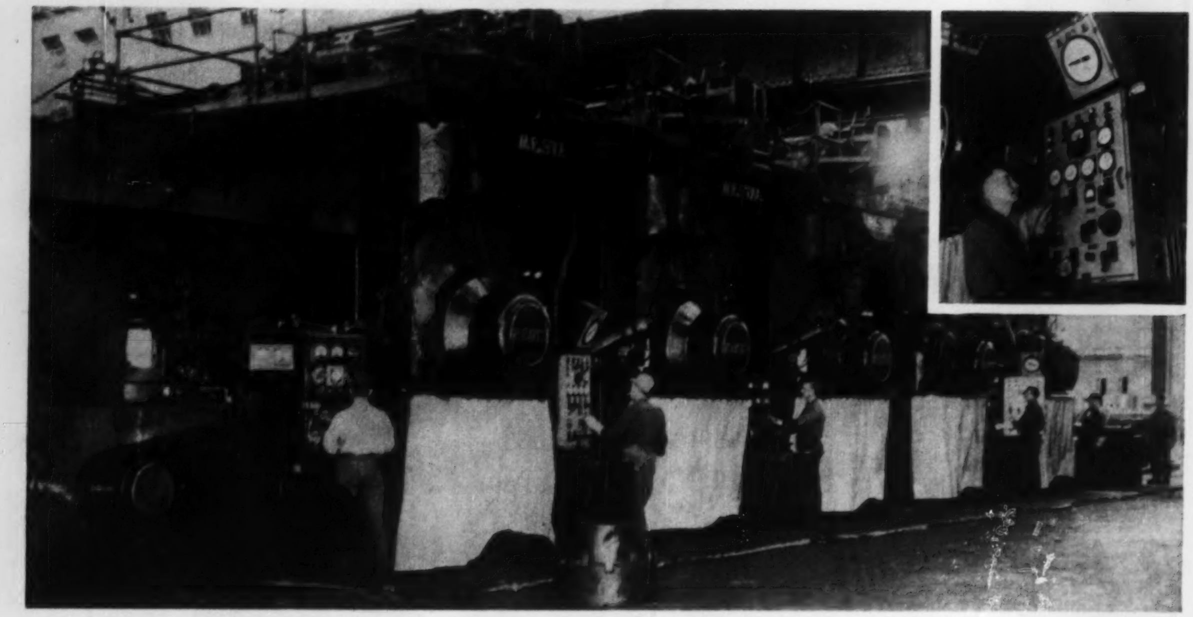
"The Revere Four-Way Service" is a 16 mm. sound motion picture in color, educational and informative. If you haven't seen it, write nearest Revere Office.



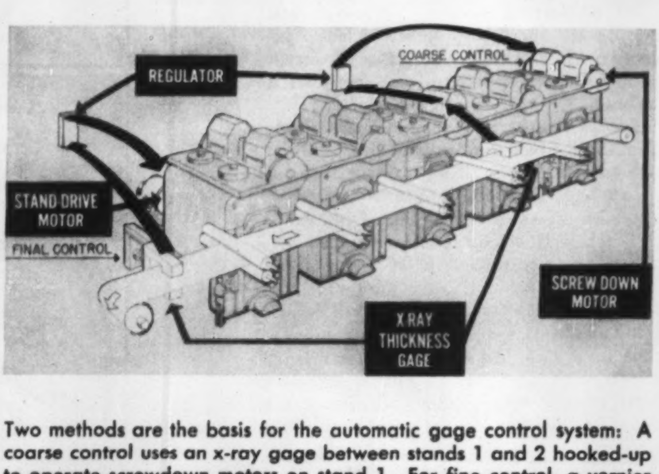
Thickness Gage That Thinks

Automatic gage control steps up quality by giving the user closer tolerance strip. In the mill, worker fatigue is reduced, and there's less waste due to off-gage steel

COLD-ROLLED STRIP coming from the 5-stand tandem mill (above) at U. S. Steel's Irvin Works is automatically kept to a tolerance of ±0.0001-in. Dials on the control box (above) do the job by holding down variances beyond set limits on the fast moving strip.

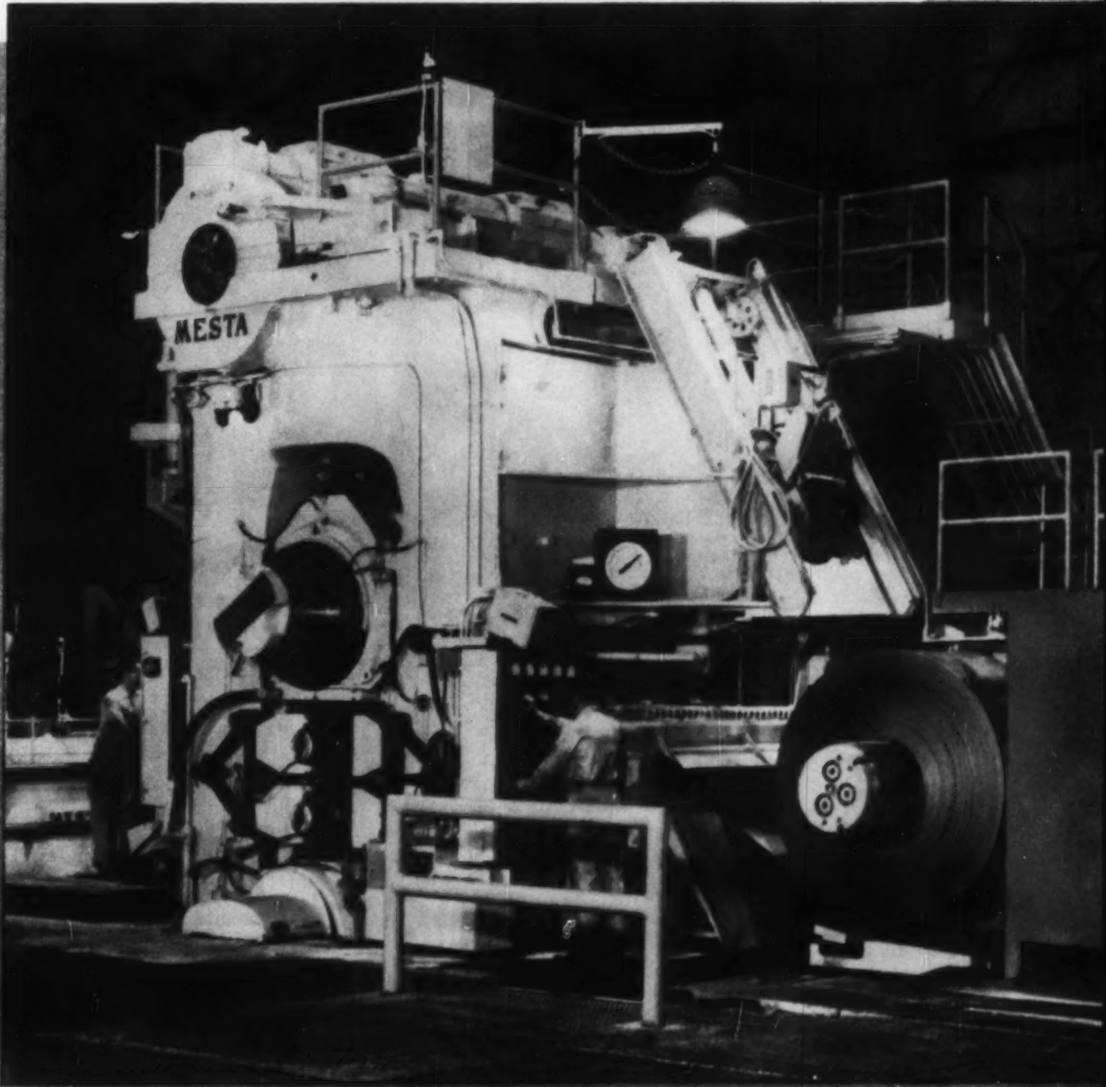
It's the first over-all thickness gage in the steel industry to use a screwdown control to link reduction on the first stand with a vernier system operating on the roll speed of the last stand, according to W. E. Miller, manager, steel mill systems engineering, General Electric Co., Schenectady, N. Y. The system resulted from a joint project by GE and U. S. Steel.

Coarse Control—In the screwdown regulator (coarse control) an x-ray gage is mounted between stands 1 and 2, to measure strip thickness out of stand 1. Desired



Two methods are the basis for the automatic gage control system: A coarse control uses an x-ray gage between stands 1 and 2 hooked-up to operate screwdown motors on stand 1. For fine control, a vernier system uses an x-ray gage after stand 5 with a regulator to vary stand drive speed to control gage

High-Speed COLD MILLS



Mesta 80" Four-High, Single-Stand Sheet Temper Mill for Coils

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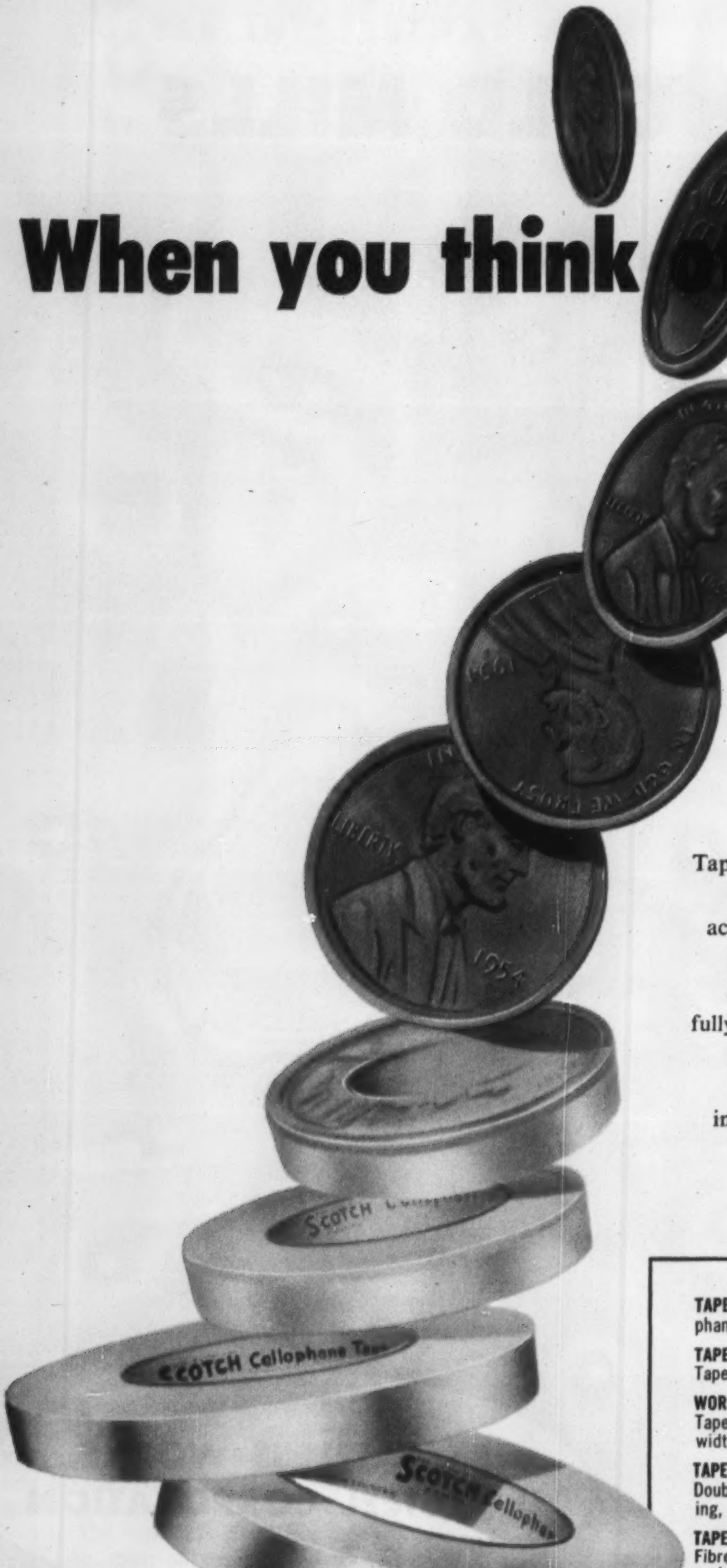


Think of its cost in pennies . . . figure the savings in dollars! In dozens of metalworking plants . . . in hundreds of ways . . . "SCOTCH" Brand Pressure-Sensitive Tapes are cutting costs, speeding production, making better products easier to make. By way of example, you can get "SCOTCH" Brand Tapes made of foil or cloth, get them as strong as steel, as flexible as fine paper, waterproof or acid resistant and even tapes that are sticky on *both* sides. What's more, these tapes may be applied by hand, by semi-automatic and even fully automatic dispensers. Here are just a few of the many ways "SCOTCH" Brand Pressure-Sensitive Tapes are now solving problems in metalworking plants:

TAPE you can SEE through! "SCOTCH" Brand Cellophane Tape—12 colors and transparent.

TAPE that takes CURVES! "SCOTCH" Brand Masking Tape—tight sticking, flexible creped paper backing.

WORLD'S STRONGEST TAPE? "SCOTCH" Brand Filament Tape—up to 500 lbs. tensile strength per inch of width.

TAPE that sticks on BOTH SIDES! "SCOTCH" Brand Double-Coated Tapes—for bonding, laminating, mounting, holding.

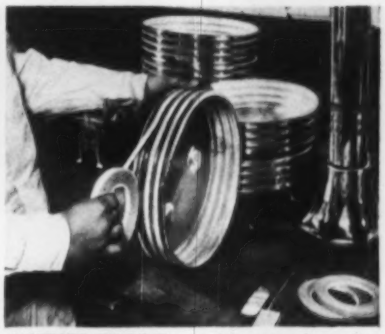
TAPE that STOPS MOISTURE! "SCOTCH" Brand Acetate Fibre Tape — long-aging, moisture- and weather-resistant.

COLORS that roll on DRY! "SCOTCH" Brand Plastic Tapes — in 8 colors; resist acids, solvents, abrasion.

think of TAPE!

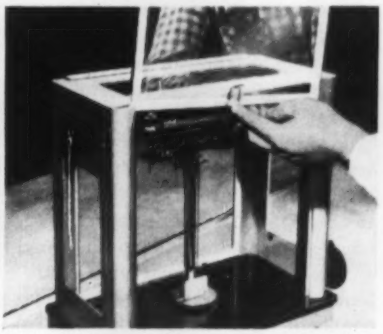
DOUBLE-COATED Tape, applied to bed of milling machine, holds metal parts in place during machining; eliminates need for time-consuming clamp or fastener set-up. Available in widths up to 36".

FILAMENT Tape bundles metal pipe, tubing, rods, bars. Tape has up to 500 lbs. tensile strength per inch of width; exclusive "mirror-surface" adhesive puts it all to work.

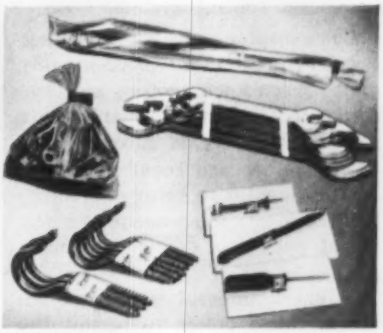


ACETATE FIBRE Tape adds attractive color to fountain stools. Tape comes in 12 eye-pleasing colors; long life adhesive holds up under temperature extremes—actually sticks at below freezing.

MASKING Tape is an "all-around tape tool" of many uses. Above: Auto manufacturer uses tape to hold vibration shims to auto frames until body is bolted to the chassis.



PLASTIC Tape cushions glass panels against vibration; makes effective glass-to-metal dust and moisture seal. Tape is applied to edges of glass before application of metal frame.



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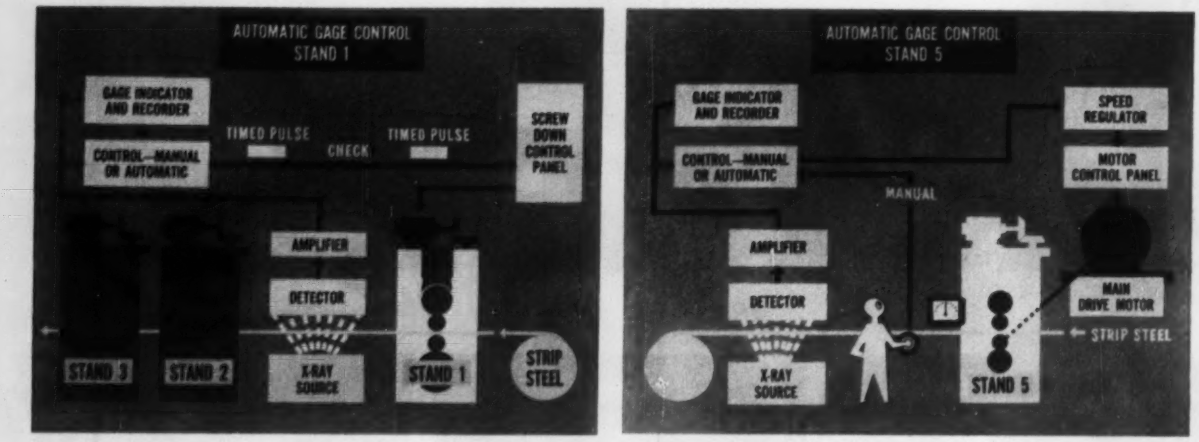


The stand 1 or coarse gage regulating system (left) is used to reduce large thickness variations to small ones. These small thickness variations are further reduced by the vernier regulator (right) on stand 5

thickness is set on the gage as a reference signal.

The difference between thickness and desired thickness comes out of the gage as a deviation or error signal. This is fed into a transistor amplifer system which determines the direction of the error and passes it on to an amplistat automatic control system.

Compensates — If strip coming out of stand 1 is 0.0005-in. off-gage, screwdown motors run for a shorter time than if the error were 0.001-in. This means screwdown motors are required to jog less frequently to bring the thickness back into tolerance than if the timed pulses or "on" times were always equal.

A check interval is allowed between timed pulses to permit the strip to get from the rolls of stand 1 to the x-ray gage position before the automatic control makes any further correction on the screwdown motors.

More Help — Several auxiliary functions are incorporated into this coarse regulator — such as automatic screw reset, screw departure indicator and screw departure limits.

Most off-gage steel going into the cold mill is at the beginning and end of the coils. The operator will select a normal screw opening which will give him on-gage tolerance during mill acceleration. The automatic gage control will maintain the desired thickness over the entire strip. At the end of the coil, any deviation of the screwdowns from the desired entering thickness will be automatically removed by the "screw reset" circuit, which will run the screwdowns back to the original settings made by the operator.

The "screw departure indicator" is a meter which shows the operator how far the screws have departed from his original openings.

Avoids Trouble—There will be times when the automatic gage control will want to run the rolls too far apart or too close together. This might lead to trouble: If the screws open too wide, slippage will occur. If the rolls are too close, the stand motor might be overloaded and shut down the mill.

The "screw departure limit" looks for trouble like this: It disconnects the automatic control when preselected limits are reached. At the same time, an alarm light is turned on to tell the operator that his control is off automatic.

Another auxiliary is automatic "regulator inspection." If the regulator does not reduce thickness error during a preselected time limit, it is removed from operation. Again, the operator is notified by a signal light.

Fine Control—The job of stand 1, or coarse gage regulating system, is to reduce large thickness variations to small ones. Then another control goes to work. It's the vernier regulator on stand 5 where small thickness variations are further reduced.

Thickness of the strip can be controlled over a limited range by varying the speed of stand 5 and the tension between stands 4 and 5. The vernier automatic gage control system uses this principle to control final gage of the strip.

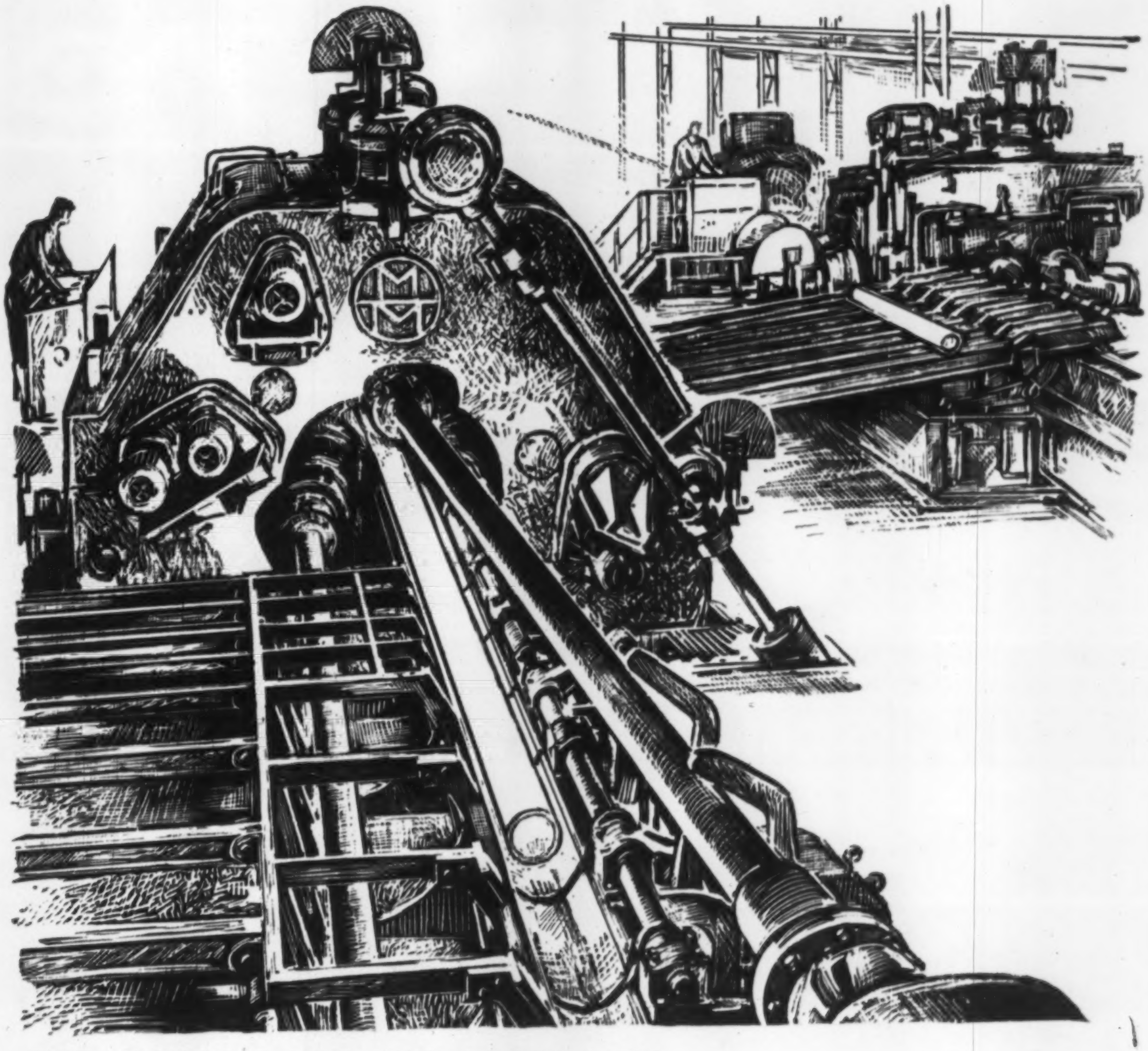
Here's how it works: An x-ray gage similar to the one between stands 1 and 2 measures thickness of strip coming out of stand 5. Again, the desired thickness is set on the x-ray gage as a reference signal.

The gage measures thickness. The difference between it and desired thickness is fed into the automatic gage control circuit as a deviation or error signal. A transistor system amplifies it to a power level suitable to be fed into the motor speed regulator.

Trouble Shooters—As was the case with the screwdown system, the vernier system also has auxiliary functions.

Since the regulator must necessarily have a limited range to prevent looping and breakage, there must be a way to tell the operator when the regulator is out of range —so that he can make manual adjustment of either screw setting or vernier speed control.

An "operating range indicator" is mounted on the operator's cabinet. As long as the meter shows within range, there are no problems. But if the meter hand goes to one end of the scale and stays there, a light goes on to tell the operator that the regulator is out of range and that manual adjustments must be made on the control for stand 5.



THE WORLD'S LARGEST ASSEL MILL

This mill, recently shipped by Mannesmann-Meer, is another example of their engineering and manufacturing capabilities. Supplied to one of the world's foremost bearing manufacturers, this mill is capable of rolling up to 8$^1/_2$" OD., heavy wall shells, and it has many design and operating features not available on previous assel mills. Progressive thinking backed by over 65 years of experience in mill operating and mill design makes it possible for Mannesmann-Meer to offer you a combination of

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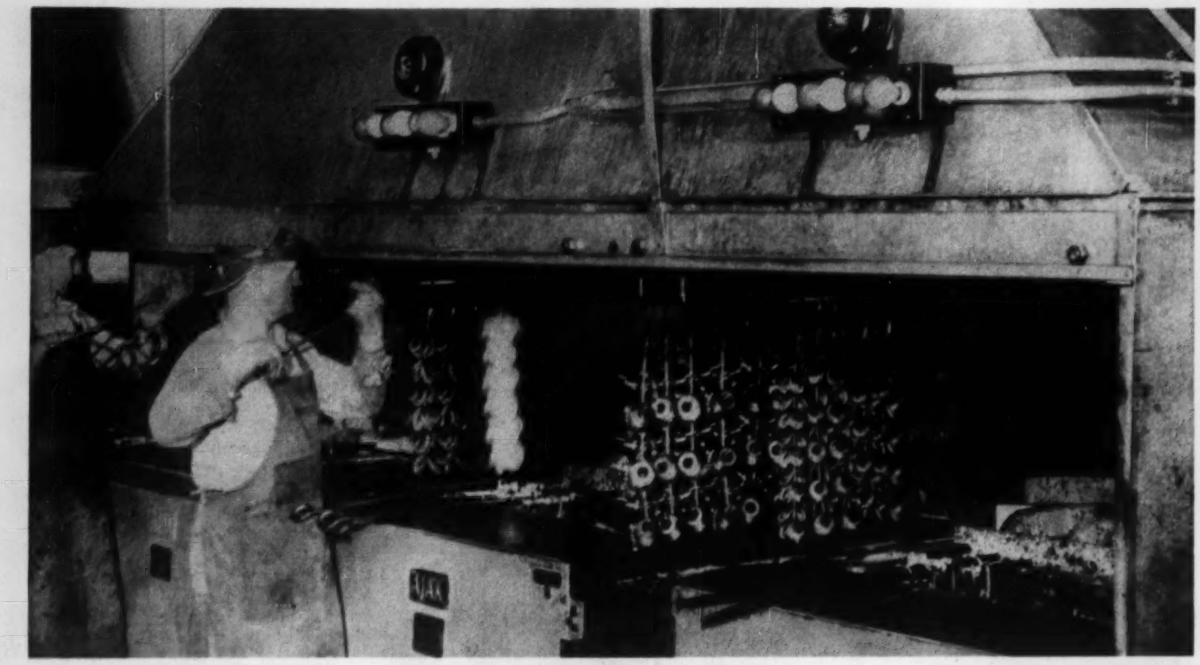
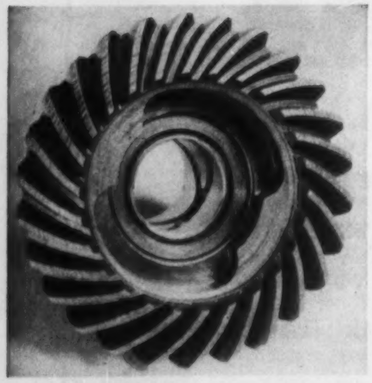
WORLD SPECIALISTS IN HIGH-SPEED TUBE MILL MACHINERY



Note signaling system on ductwork of salt bath furnaces. It permits precise timing of every work batch

Salt Bath: Case for Gears

By J. L. RAYNIAK
Vice President
Johnson Motors Division
Outboard Marine & Mfg. Co.
Waukegan, Ill.



Transmission gear for outboard motor has been case hardened by liquid carburizing process to RC 60-62

WE'VE cut finishing costs due to heat treating distortion from 7½ to less than 2 cents on each spiral bevel gear for our Sea Horse outboard motor.

Reason: Our salt bath holds both ID and OD of hardened gears under 0.001 in. total out of roundness.

The spiral bevel gears are machined from SAE 4615, cold-drawn steel, then salt bath case hardened. Only two finishing treatments are required: Honing the inner diameter and hand lapping the thrust face.

There's no decarburization; gears have uniform hardness and good yield strength.

Setup — Five internally heated salt bath furnaces, made by Ajax Electric Co., Philadelphia, constitute our inline production setup. They have a combined connected load of 210 kw.

Process—Gears are racked on tree-type alloy fixtures that accommodate 12 gears. Fixtures are supported on horizontal rods (five per rod), and immersed in the 1675° F carburizing salt for 2½-hours.

Carburizing furnaces have a capacity of four rods loaded with fixtures, or 240 gears. Their working dimensions average 24 in. x 15 in., with 18-in. salt depth. Water soluble carburizing salts, with 12 to 16 per cent cyanide content, are used.

Reheated — Gears are taken from the bath and air cooled to room temperature, then immersed in a 1525° F bath and reheated for 30 minutes. (Reheating minimizes the amount of retained austenite in the hardened case. Excessive retained austenite would impair the yield strength and promote spalling or cracking.) Oil quenching, washing, rinsing, drying and tempering at 325° F for 1½-hours complete the heat-treating cycle.

The hardened gears have a 0.020 to 0.025-in. case depth and a hardness of RC 60-62. Since putting in the salt bath method, overall heat treating and finishing costs have been cut 70 per cent.

"HOW FAR THAT LITTLE CANDLE THROWS HIS BEAMS!"

Merchant of Venice

The glow of the Christmas candle . . . symbol of love and caring . . . of warm shelter and gentle hearts. Symbol, too, that tiny flame, of all the material things that, not only at Christmas but at every other time as well, feed you, house you, clothe you, transport you, entertain you, protect you. All have their origin in flame . . . the flames of industry . . . contained by refractory brick.

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Farmers Bank Building
Pittsburgh 22, Pa.

These jet engine parts formerly were drawn and machined. Flow turning cut machining 40 per cent

Flow Turning Bridges the Gap

FORD'S Aircraft Engine Division is using flow turning to make four jet engine parts like the one above. It's so successful that 23 more parts will be added to the regular production schedule during the coming year.

The savings—40 per cent in machining and reduced scrap—pave the way. In one case, flow turning saved 85 lb in the rough forging stage.

Application—Ford maintains a "semiproduction" department as a trouble shooting section, ready at a moment's notice to turn out any parts general manufacturing or vendors can't produce on schedule. They found flow turning fitted the bill and added a contouring attachment of their own design. Their own machinists now can turn out regular production on short notice.

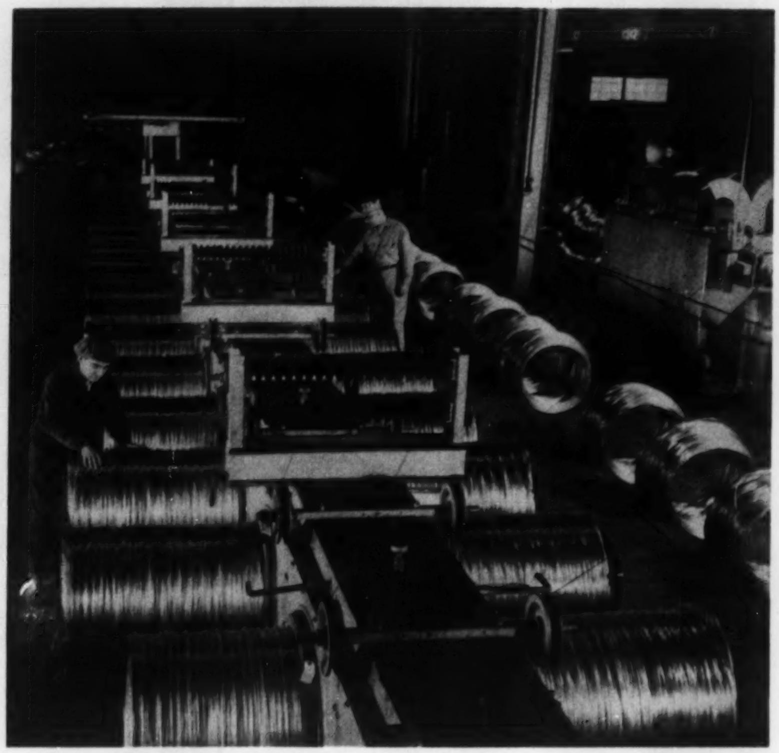
If you're looking for a tool to supplement your regular production program and to fill the gap in emergencies, flow turning may be the answer. Once a part has been developed beyond the design stage, a small investment in an arbor, contour template and roll is needed.

Development—In order of importance, the rough part design comes first. Following are arbor design, roller selection and proper adjustment. The final phase requires rework of the roller, arbor and blank or rough shape. In these, the operator plays an important part.

Skills—Operation of a flow turning machine can be learned quickly by a machinist.

The operator is ready to flow turn a rear bearing support. The operation takes only 2 minutes

Highlights on wire descaling, inventory control, sales forecasting, lime coating . . . from the meeting of the Wire Association



Jones & Laughlin Steel Corp.

Descaler Cleans Rods with Cut Wire

ELECTRONICS, about to enter the wire industry, is expected to make quick work in determining the balance between inventory and production items.

German wiremakers have developed something new in the art of cleaning the surface of wire rods in multiple strands.

Those two innovations were the high points at the technical sessions of the annual meeting of the Wire Association, Chicago, Nov. 14-17.

Orders Speeded—T. M. Girdler Jr., assistant division manager, Union Drawn Steel Division, Republic Steel Corp., Massillon, O., announced that his plant was installing electronic equipment to expedite orders through the mill.

To get an order from the West Coast to the plant by mail and route it through channels may consume three weeks. When the electronic system begins to function in the near future, orders will be moving through the mill within a few hours after receipt.

Descaler—The rod descaling method was described by A. O. Kogel, manager, Westfalische Drahtindustrie, Westphalia, Germany. Equipment includes a take-up frame, lime bath, pulling mechanism, descaling machine, straightener and pay off reels.

The descaler consists of three individual rolls, each designed to handle 24 strands of rods up to ¾-in. The rolls are installed in train, but are so mounted that the 24 strands become arranged in an equilateral triangle while in transit. Cut wire, 0.0157-in., and known as No. 170 shot, is employed as the abrasive.

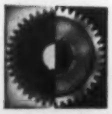
Fast Work—Speed of the rod through the descaler is 40 to 60 fpm. The shot blasting wheels, which operate at 2400 rpm, deliver the cut wire abrasive at 15,000 fpm, to assure uniform cleaning of the wire rods on all sides. About 2¼-lb of cut wire are used per ton of rods cleaned.

Cost of cleaning rods by this method averages $2.50 per ton. Coils are welded together at the front of the line to permit continuous operation. The process is being used for low-carbon rods, but a plant is to be built for processing high-carbon stock.

Watch Inventory—Study of individual merchant trade items can result in establishment of minimum and maximum inventory and serve as a guide for sales, production and operating departments, said J. L. Sanderson, superintendent of wire mills, Keystone Steel & Wire Co., Peoria, Ill. Inventory control at his plant began with a complete survey of all incoming orders and the method of processing them over a period of years.

Mill orders, he explained to the symposium on production scheduling, should give adequate information, such as manufacturing procedure and shipping instruction, so that the mill manager is able to set up his schedule a week in advance.

Questions submitted to the



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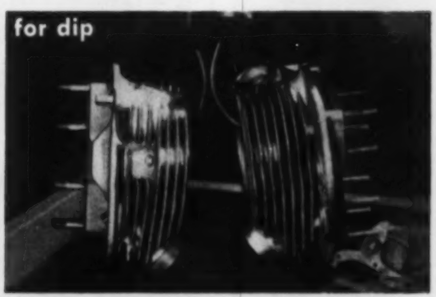
DOW



with every use, you'll find more to like about

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(Dow 1,1,1-Trichloroethane, Inhibited)

This general-purpose cold degreasing solvent, after extensive research, development and commercial use, has established itself as one of the most *versatile* solvents ever developed. CHLOROTHENE* has extremely *high solvent power* . . . makes short work of greases, oils, tars, waxes, the most troublesome contaminants. Yet stabilized CHLOROTHENE has extremely *low corrosive effects* on all common metals. Its greater *safety* appeals to users, too . . . M.A.C. is 500 ppm., as compared to carbon tetrachloride's M.A.C. of 25 ppm. Another safety feature: CHLOROTHENE has no flash or fire point; it is certificated† for use as a ships' stores article by the U. S. Coast Guard.

Easy-to-use CHLOROTHENE is made *exclusively* by Dow. Call your Dow distributor today for a supply. He's your source for vapor-degreasing solvents, too . . . stabilized DOW TRICHLOROETHYLENE and DOW PERCHLOROETHYLENE. For more information on these superior chlorinated solvents, and for the name of your local Dow distributor, just drop a line to THE DOW CHEMICAL COMPANY, Dept. S672D, Midland, Michigan.

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Certificated for use as an article of stores on board vessels. This certificate covers only hazard in the use of this product. The efficiency of this product is not passed upon.

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Fine Gears Made to Order

SPUR GEARS—Straight, helical, and internal. Sizes from 16 pitch, 1½" dia., to 1½ pitch, 36" dia.

HERRINGBONE—(*Fellows Type*). Sizes from 1½" to 15".

SPIRAL BEVEL—Sizes from 16 pitch, 1½" dia., to 1½ pitch, 28" dia.

STRAIGHT BEVEL—Sizes from 16 pitch, 1½" dia., to 1½ pitch, 28" dia.

HYPOID—Sizes from 1½" to 28" dia.

ZEROL—Sizes from 16 pitch, 1½" dia., to 1½ pitch, 21" dia.

WORMS AND WORM GEARS—Worms to 7" dia. Worm gears to 36" dia.

SPLINED SHAFTS—Lengths to 52". Diameters from 1" to 6".

DIFFERENTIALS—10,000 to 300,000 inch pounds capacity.

Note: All of the sizes above are approximate.

Ask for interesting, illustrated bulletin.

FAIRFIELD
MANUFACTURING CO.
2313 South Concord Road • Lafayette, Indiana

symposium brought out the opinion that the sales department of any wire mill should not be allowed to schedule more than 85 to 90 per cent of theoretical capacity.

Crystal Ball—Accurate sales forecasting is one of the difficulties facing the wire industry. Some wire-makers stated it involves a forecast of trends of all phases of business.

Caution was expressed by one executive that sales forecasting should not be taken too literally. Every attempt should be made to evaluate trends. They may fit the mold for the next three months, but any change in the market will obsolete the forecast.

Problem Lime — Quicklime, slaked under ideal conditions, produces a hydrated lime suspension more ideally suited to wire drawing than commercial hydrated lime, according to T. C. Miller, technical director, Industrial sales division, National Gypsum Co., Buffalo. The benefit of a higher specific surface for freshly slaked lime offers greater potential for an improved coating as a grease carrier.

The major lime problem is the increase in coarse particles being produced in slaked lime suspensions which result in inferior coatings, Mr. Miller pointed out. But by admitting live steam to the slaked lime suspensions, bath temperatures below 200° F will be maintained.

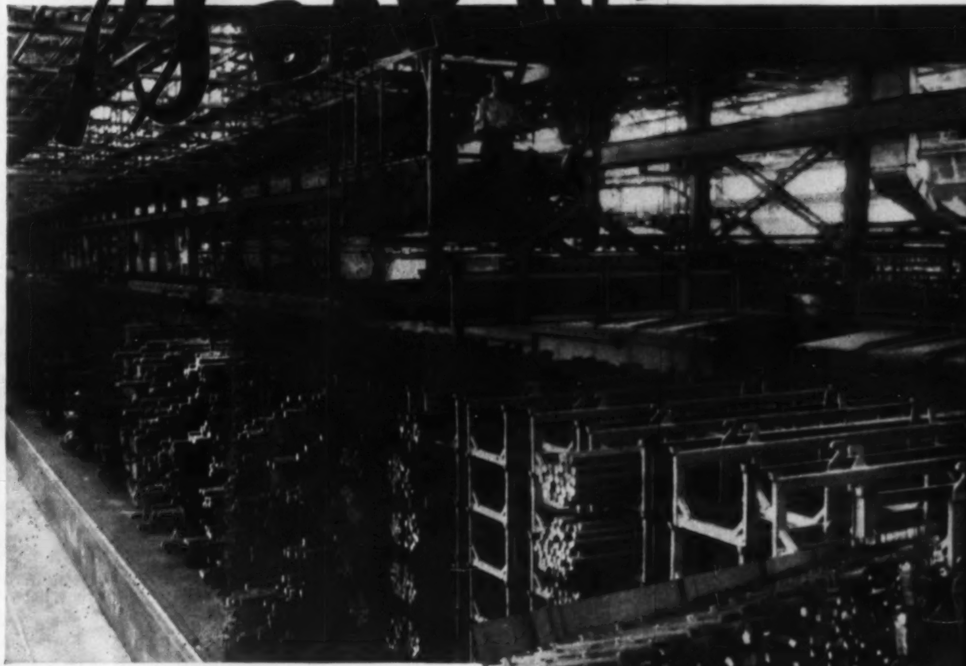
Any heat above this temperature will be dissipated by the large volume of water in the bath at atmospheric pressure. A few installations using live steam show no evidence of crystalline slaked lime after several months operation.

Simple Cable—Only two materials are used in a new type of mineral-insulated electrical cable rated at 600 volts: Copper for the conductors and seamless outer sheath, and highly compressed magnesium oxide for the insulation. This was brought out by G. S. Eager Jr., assistant director of research and S. P. Lamberton, research supervisor, General Cable Corp., Bayonne, N. J. The cable is self-contained within the seamless sheath and is the first for general use to be completely nonflammable.

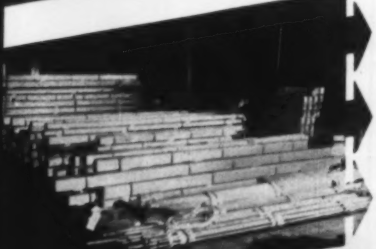
Why USE OUTMODED EQUIPMENT AND SYSTEMS TO STORE BAR STOCK?

When YOU CAN DO IT SO ECONOMICALLY, EFFICIENTLY AND SAFELY *with* PS PORTABLE *Heavy Duty* BAR RACKS

Inefficient bar stock storage equipment and systems add to your production costs, invariably increase the price of your product, often make stock handling unsafe for employees.



Stock storage and selection using automatic tongs suspended from overhead cranes are neatly and efficiently performed.



Stock checking is no problem at all in this storage area with its tiers of Palmer-Shile Bar Racks.

Why not use modern, cost-reducing PALMER-SHILE portable heavy duty BAR RACKS with superior design features that enable you to tier and store with such ease and safety? Racks are engineered to save you valuable floor space and make stock handling and selection so simple.

Check these advantages against your present equipment and system then decide on Palmer-Shile bar racks for *your* plant:

1. Channels at the bottom of the rack have cold formed upset slots in them that make possible wrap around crane bars for flush rack bottom, insuring sturdy, rigid, safe tiering—rack upon rack.

2. Heavy gauge steel safety stacking pockets on rack corners eliminate danger of rack slipping or falling.

3. Double thickness lifting lugs welded to wrap around channels, for maximum strength and safety.

Let our engineers explain to you why these and other design features make Palmer-Shile racks a good investment in more efficient handling of bar and other stock. Racks are engineered-built to your specifications for any size load and capacity.

Modern stock storage in sturdy portable heavy duty Palmer-Shile racks saves floor space and permits storage of more stock tonnage.

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TYPE F STEELFLEX COUPLING

- Any Size
- Any Service
- Any Application, Horizontal or Vertical
- Always available

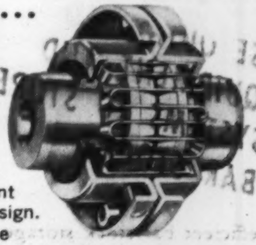
The exclusive grid-groove design of
FALK Steelflex Couplings
protects your machinery in two ways

You get double protection when you connect your driving and driven machinery with a Falk Steelflex Coupling—the all-steel-built coupling with the exclusive grid-groove design! First, its torsional resilience smothers shock and vibration; and second, the Steelflex design prevents damage and lowered efficiency by accommodating shaft misalignment.

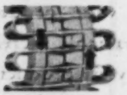
Why have increasing numbers of key men in industry standardized on Falk Steelflex Couplings? Their experience has proved that Falk Steelflex Couplings prolong the service life of their machinery...are trouble-free and need minimum maintenance...are easy to install, lubricate and disconnect ...and cost less per year of service than ordinary couplings.

One basic Steelflex design—the Type F, in its many sizes—is adaptable to more than 90% of all industrial applications. This facilitates buying, as well as prompt replacing and servicing when necessary. Write to Department 247 for engineering bulletin, including selection and dimension details.

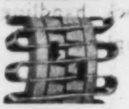
How shock and vibration are smothered by the FALK Steelflex Coupling's Torsional Resilience . . .



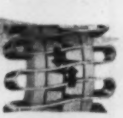
This cutaway view shows the sturdy all-steel construction, also the exclusive, torsionally resilient grid-groove design. Here is how the grid-groove design functions:



UNDER LIGHT LOADS The gridmember bears only at outer edges of grooves. The long span between points of contact remains free to flex under load variations.



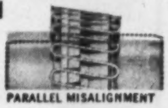
UNDER NORMAL LOADS As load increases, the distance between supports on grooves is shortened proportionately, but a free span remains to cushion shock loads.

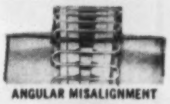


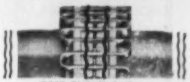
UNDER SHOCK LOADS Under extreme overloads, the gridmember bears fully on the grooves and transmits full load directly. The coupling remains flexible, within its rated capacity.

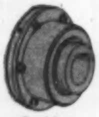
SHAFT MISALIGNMENT ACCOMMODATED
Free End Float Permitted

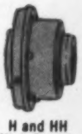
Controlled flexibility in the FALK Steelflex coupling provides compensation for parallel and angular shaft misalignment—and permits free end float for the shafts of the driving and driven members, or of either one.

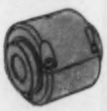

PARALLEL MISALIGNMENT

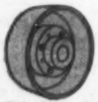

ANGULAR MISALIGNMENT

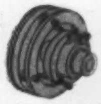

FREE END FLOAT


Rapid CM—Reversing Service


H and HH High Speeds


FS—Limited Space


BW—Brakewheel Service


FT—Overload Control

P and PP Extended Shaft

OTHER TYPES AVAILABLE

In addition to the standard Type F (which meets more than 90% of all applications), special or dual purpose Steelflex designs are available for unusual applications. A few of the many types are shown here.

THE FALK CORPORATION, Milwaukee 8, Wisconsin

MANUFACTURERS OF

- Motoreducers
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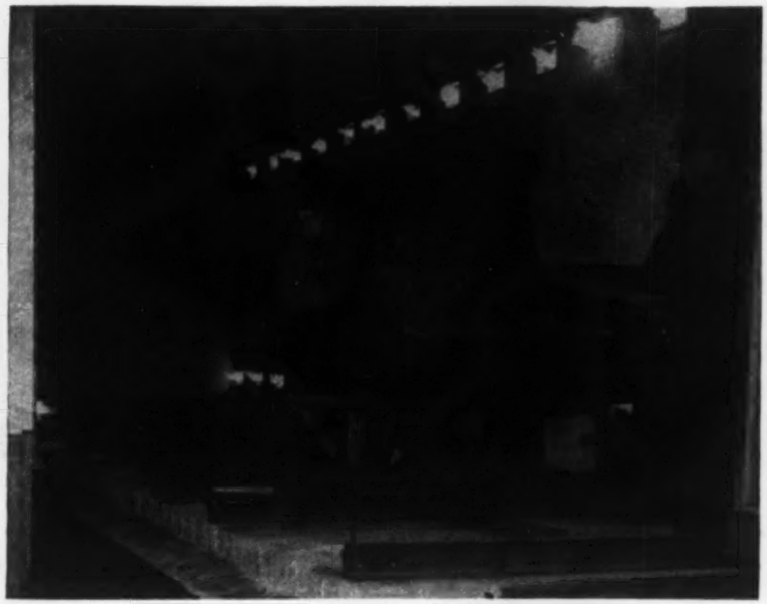
FALK

...a good name in industry



This furnace is one of the largest used for stress relieving. Castings or weldments up to 50 ft long are placed in position and blocked on the insulated flatcar

Big Stress Reliever

STRESS RELIEVING welds in huge castings and weldments is easier, thanks to a new furnace (50 x 20 x 15 ft) at Morgan Engineering in Alliance, O. Equipped with two-fuel combination burners, it can heat a 250,000 lb load to a maximum of 1750° F in less than 9 hours.

Controls—Raising the temperature of heavy castings 200° F per hour requires careful control to prevent induced stresses, especially in castings with sections of greatly varying thicknesses.

The electronic control system provides for a 25° F differential. If a thin section becomes hot faster than the thicker sections, the furnace is slowed down to allow a longer soaking period and time for the thicker sections to reach the same temperature.

The furnace heat chamber is divided roughly into three zones for temperature control. Pneumatic potentiometers equipped with circular charts regulate and indicate the temperatures. A built-in programmer times the rate of heating, length of soak period and furnace shutdown.

Safety devices are locked in with the controller to provide positive shutoff in case of overheating, power or fuel supply failures.

Burners — At maximum output, 48 burners provide 33 million Btu per hour. Each one can burn either gas or oil. Combustion air is provided from a central blower powered by a 50-hp motor. As shown in the illustration (above), the burners are mounted in ports arranged along the top and bottom of both sides of the furnace.

Work—A brick insulated flatcar as long as the furnace moves the work into the furnace. A chain puller supplies the moving power. The bulkhead-type door is a part of the car—as the car moves into the furnace, the door also closes. Sand seals the opening between the closed door and the furnace door frame.

PURCHASE ORDER

WHETHER YOU BUY...

OR SPECIFY...

This Unit Is
The Answer To
- production waste
- design problems
- fire risk
- excessive repair bills

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AUTOMATIC LUBRICATION

Automatic lubrication is one thing that designers, plant engineers and production men insist on these days—for their own machinery . . . and the equipment they manufacture. And careful purchasers make sure the automatic lubrication systems they buy are *Bijur Systems.*

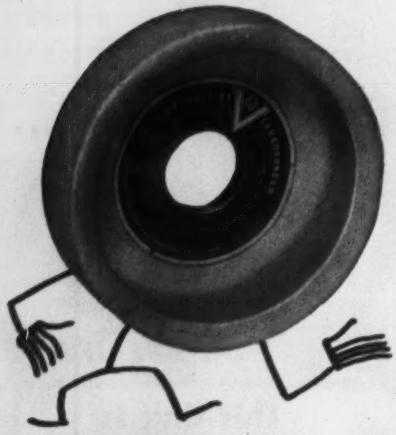
For nothing protects like Bijur. Bijur Systems save production time and repair bills . . . reduce downtime and fire risk . . . lengthen machine life . . . and eliminate product spoilage due to over-lubrication. Bearings are never thirsty for oil, never flooded.

That's why it's just good business to have a custom-engineered Bijur System on the equipment you own, and *design* one into the equipment you manufacture. Installation is easy, cost is minimal, savings are substantial. Write today for *all* the facts about Bijur Systems!

P-3

BIJUR
LUBRICATING CORPORATION
Rochelle Park, New Jersey
Pioneers in Automatic Lubrication

FROM COAST TO COAST REPORTS


CARBORUNDUM

ON HIGH SPEED STEEL:
"Holds form twice as good. Does not burn or load."

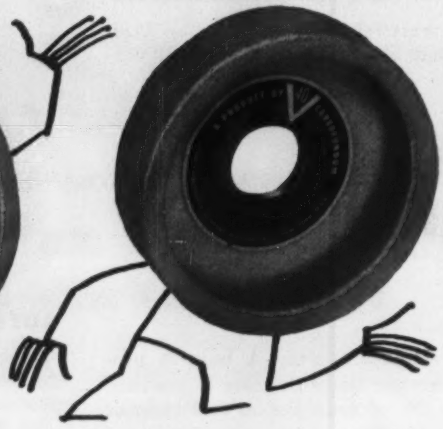
STEEL SAW RESHARPENING:
"Held size...smooth and cool cut... no burn."

A PRODUCT BY V40 CARBORUNDUM

ON HIGH SPEED STEEL DIE BUTTON:
"Less heat, no burn and allows heavier stock removal per pass."

A PRODUCT BY V CARBORUNDUM

BROACH GRINDING:
"Three times the production... much cooler cutting."


A PRODUCT BY V40 CARBORUNDUM

DRILL GRINDING:
"Three times the production...no chatter on small drills...no burn...better finish."

A PRODUCT BY V40 CARBORUNDUM

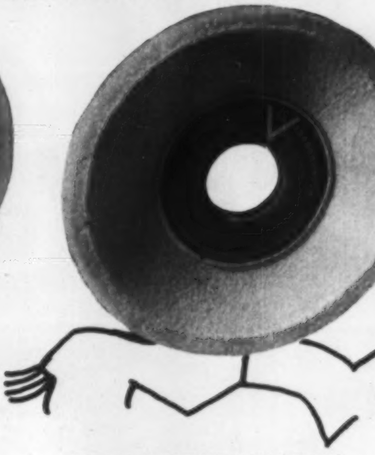
ON HIGH SPEED STEEL FLAT FORMS:
"Gave cuts up to .040" with very little breakdown."

"V-40 IS

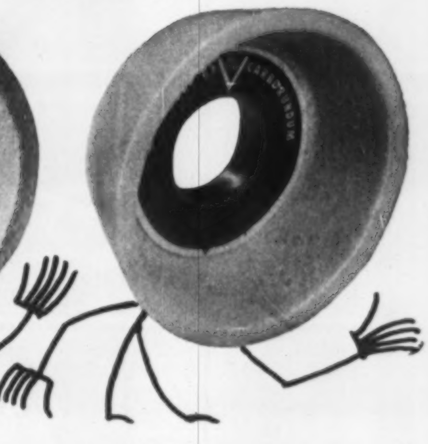
TRY ONE NOW in your own shop, on your own equipment. See how "V40" outperforms any other tool room wheel you can use. Call your CARBORUNDUM Distributor or salesman for a demonstration today. He's listed in the yellow pages of your phone book under "Abrasives" or "Grinding Wheels." Or write The Carborundum Company, Dept. S 81-513, Niagara Falls, New York. In Canada: Canadian Carborundum Company, Ltd., Niagara Falls, Ontario.

ARE COMING IN...

CYLINDRICAL GRINDING:
"Dresses with ease...better finish and cuts more freely."

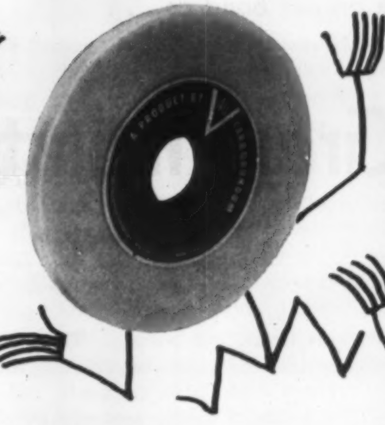


GEAR CUTTER GRINDING:
"Much less wheel breakdown. No burn."



ON SOFT STEEL:
"Superior in all respects."

CIRCULAR BROACH GRINDING:
"8 broaches per dressing against normal 3."



ON CHROMOVAN DIES:
"Excellent size control. Gave cuts of .010" with very cool work."

SIDE MILLING CUTTER GRINDING:
"Held size around the cutter. No burn on cutter."

TERRIFIC"

WHAT USERS SAY about "V40" Wheels is important to us...and to you! It provides the most critical measure of performance where it counts most—*on the job!* The comments above are but a few received from hundreds of "V40" Wheel users all over the country...in every type of grinding operation...on many different materials.

YOU CAN BENEFIT from the outstanding features of "V40" Wheels. For example, the superior form-holding ability of "V40" eliminates costly stops for wheel dressing and re-set-up midway through a job. Yet the special vitrified bond permits far faster, easier dressing between jobs—with substantial savings in diamonds, time and abrasive.

CARBORUNDUM

REGISTERED TRADE MARK

...continually putting more **SENSE** *in your abrasive* **DOLLAR**

81-613

Separate materials form the proper bond as . . .

Printed Circuit Industry Expands

By STANLEY B. STEWART
Associate Editor, New York

COPPER FOIL, plastic laminates and adhesives are combining to bring the printed circuit industry a more workable "board."

History — Printed circuits have been produced by: 1. Plating metal patterns on plastic boards. 2. Spraying metal into depressions in plastic plates. 3. Bonding rigid wiring harness to a plastic base. 4. Fusing silver ink patterns on ceramics. 5. Etching metal-clad thermosetting plastics (the most popular).

While copper is the most widely used material, silver and brass are excellent current carriers. The problem: Finding suitable adhesives to provide an adequate bond. Aluminum bonds well but runs into difficulty when it comes to soldering.

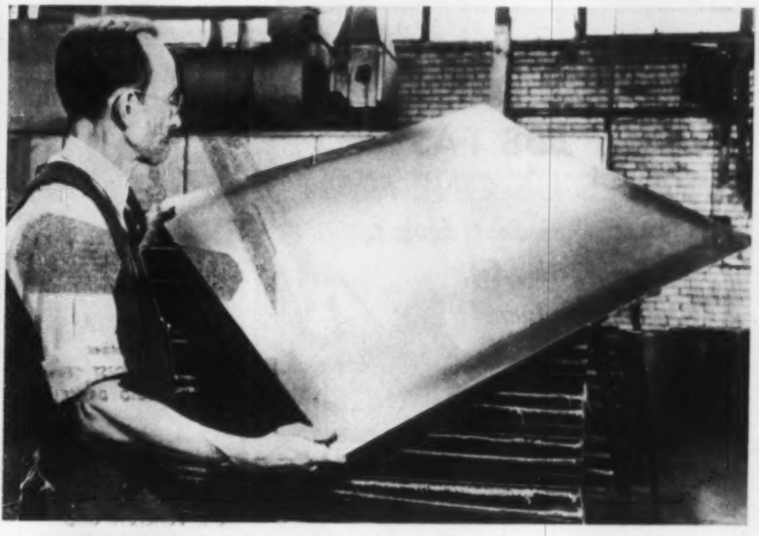
Printed circuitry is reducing the number of conventionally wired connections between electronic components (resistors, coils, sockets) by using a series of thin metal conducting strips bonded to an insulating panel. The metal strip used must be able to withstand high soldering heats and be capable of being securely bonded to a laminate base.

What Kind—Electrolytically deposited and rolled copper foil can be used for printed circuit applications. The electrolytically deposited foil is most often used in thicknesses of 0.00135 and 0.0027-in. Rolled copper foil (0.0015-in.) is also available. Rolled foil is not subject to porosity or pinholes. This makes it of special value in delicate circuits. Sheet size runs about 35½ by 37 in.

Bonding — The Permacel Tape Corp. produces an adhesive-copper foil combination for use in printed circuitry. By making the copper foil an integral part of its adhesive coated backing, a step is saved in bonding the final copper-clad laminate. It also markets a thermosetting adhesive film which is used with the build-up method of laminate, adhesive and copper foil. The Rubber & Asbestos Corp. is producing an adhesive coated copper consisting of an electrolytic grade copper which has been coated with high-peel-strength, high-temperature-resistant adhesive for bonding copper to rigid laminates based on phenolics, epoxy or polyester resins.

The proper adhesive must be strong; have good heat resistance to allow for soldering without blistering; be resistant to shock and moisture and at least match the laminate in electrical properties. Problems involved: 1. Thermoplastic adhesives may blister during soldering operations and have too much cold flow under normal operating conditions. Common thermosetting adhesives do not possess the required shock resistance and do not bond copper foil correctly. The solution: A mixture of thermosetting and thermoplastic resins was developed (Armstrong Cork Co. uses a mixture of phenolic and vinyl resins).

The operator carefully aligns each pack before applying pressure



Each foil-clad sheet is inspected for blistering, cracks or improper bonding after being removed from the laminating presses

Some "laminators" manufacture their own bond sheets.

Laminates—Synthane Corp. produces them by impregnating or coating a filler material (paper, cotton fabric or glass) with a thermosetting resin. A specified number of layers are bonded together by applying heat and pressure. The chemical reaction transforms the layers into a light, yet hard, sheet which will not "delaminate" and cannot be softened by further heat applications. These sheets may be plated on one or both sides with copper foil.

Laminates other than phenolics, such as melamine epoxy and silicone, may be used. Melamine resins are used where arc resistance is an important factor. Epoxy and silicone resins are called for when heat resistance is of prime importance. Flame retardant additives may be incorporated into most of the thermosetting resins and these tend to increase the resistance of the laminate to flame.

Assembly—There are two general methods: 1. The adhesive is placed on the laminate with the copper foil on top. The build-up is then placed under heat, 320°F, and pressure of some 1000 psi for 1 hour. Adhesive film and copper foil may be added to both sides of the build-up. 2. To meet closer thickness tolerances, the copper clad laminate is produced by sanding a finished, cured sheet of laminate to the desired thickness, then adding the adhesive and copper foil. It is then returned to the press for an application of heat and pressure.

After bonding, copper-clad sheets are often sprayed with a strippable plastic film for protection against scratching, oxidation and scarring during trimming, packing and shipping.

Finished Sheet—To be used in printed circuitry, the finished copper-clad sheets must resist peeling, heat and moisture. The copper surface must be almost free of wrinkles, pits, nodules, scratches, pinholes and oxidized areas. Uniform thickness is a must and the copper must be relatively soft to retain proper punching characteristics.

Fabrication — Copper-clad laminates may be fabricated with the same machinery and methods used for sheets without the foil. Shearing and sawing create little problem. Special care must be taken in the design of progressive piercing and blanking dies, so that the stripper plate will prevent any lifting of the foil as punches are withdrawn. Drills should be sharpened with a negative rake. By doing this, the drill will not catch the foil and lift it away from the laminate, when holes are drilled through a narrow line of metal or at the terminations of a line. One problem which has no general solution is how to get rapid punching in exact register with the etched pattern.

Assembly of printed circuits into finished electronic or electrical devices is as varied as applications. One method: Punch or drill holes through the conductor and the laminate; insert leads of standard components in the holes; and solder the leads to the conductors. Dip soldering has been successful as an assembly technique for smaller units.

Future—Where an electrical device calls for miniaturization or increased lightness, printed circuitry may be a solution. As it becomes more generally used, the "board's" uniformity and strength will allow printed circuits to be used as subassembly plug-in replacement units. Low-power apparatus (television, radio, hearing aids, automatic signals, etc.) will use more printed circuits in the future. Designers are considering how smaller, inexpensive radios and vest-pocket tape recorders can be mass produced with the help of printed circuitry.

• Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Service, STEEL, *Penton Bldg., Cleveland 13, O.*

SILENT HOIST
KRANE KAR

"DOES JOB FASTER,
SAVES US ONE MAN,"
says Jim Gull, Supt. Equip't.,
Gull Contracting Co.,
New Lincoln Tunnel
Job, New York

Another
SILENT HOIST "First"
—FLUID DRIVE!

"We had a 20-ton crane on the job; now the KRANE KAR* does it faster and saves us one man. Works all over site as utility crane, 8 hrs. a day, 5 or 6 days a week. Handles beams, buckets, concrete and steel forms, lumber, cement, etc. Stores incoming materials and delivers them where needed. Loads, unloads trucks, and carries big loads up and down ramp. KRANE KAR is easy to operate; we have a half dozen men here who can run it. Doing a fine job for us," says Mr. Gull.

Write for illustrated Bulletin No. 79

****KRANE KAR Swing-Boom Mobile Crane available gas or diesel; adjustable telescopic boom; rubber tired; 5 sizes: 1½, 2½, 5, 10, 12½ ton cap.***

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Pioneer Mfrs. of Heavy Duty Materials-Handling Equipment
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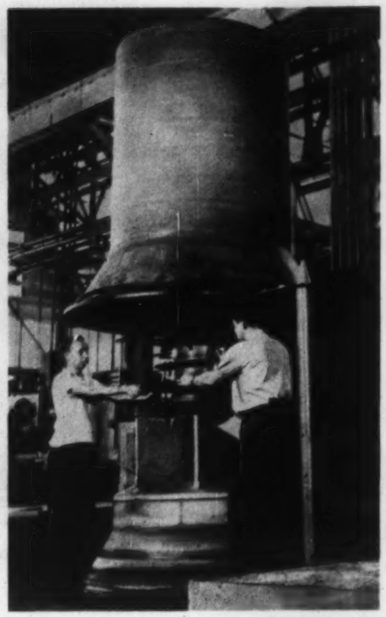


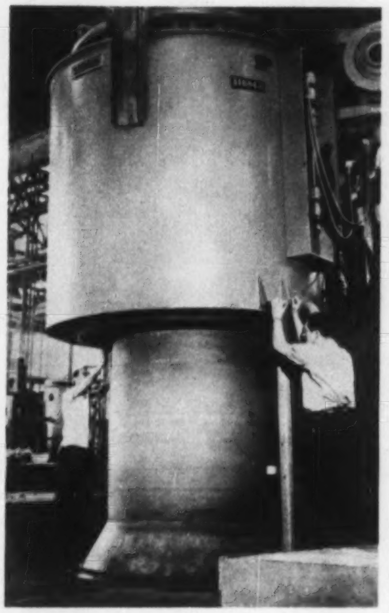
Loading and positioning jet engine parts for vacuum brazing. Bell-shaped retort above the operators, when lowered, forms inner furnace chamber

Vacuum Brazing on Trial

BRAZING in a vacuum is moving toward the production line. Pratt & Whitney vacuum brazes jet engine parts and assemblies but is keeping mum about results.

The National Advisory Council on Aeronautics isn't so hesitant. It reports that vacuum brazes are 50 per cent better than dry hydrogen brazes. The furnace maker (Stokes Machine, Philadelphia) claims that in a high vacuum, free from oxidizing gases, brazes are better and cheaper than any produced in hydrogen, dissociated ammonia or other special atmospheres.

Vacuum brazing takes a day and a half for one cycle—which is comparable to the time for hydrogen



Both inner and outer shells are positioned by vertical, tubular guides. The outer shell contains the heating elements

atmosphere brazing. The furnace at Pratt & Whitney can use any special atmosphere, vacuum or even ordinary air. Such multiple use widens the possibility of other production work to amortize the cost.

Production—Parts are prepared by mounting them in a holding fixture and wrapping the proper amount of brazing wire around each joint. The fixture fits on the furnace base. Connections for evacuating the furnace lead from the base to booster and fore pumps.

Two bell-shaped covers—one on top of the other—fit around and over the base, forming the furnace. The outer, or top, cover contains the heating coils. The innermost space contains the parts for brazing and is evacuated to a pressure of 0.05 micron or less. The space between the inner and outer covers (like a double boiler) is partially evacuated at the same time.

Water-cooled O-ring seals between the furnace base and the inner and outer shells provide a tight seal.

At 2150° F the brazing wire melts and infuses the joints. Compared with air brazing results, peel tests show greater ductility. Shear tests indicate a strength of 63,000 psi.

52100

Now LEADED!

Now you can obtain the advantages of leaded 52100 Steel in round bar stock. The presence of lead acts as a lubricant, resulting in freer machining, quicker, cleaner cutting, better finishes and longer tool life. All these advantages are conducive to greater production at reduced costs.

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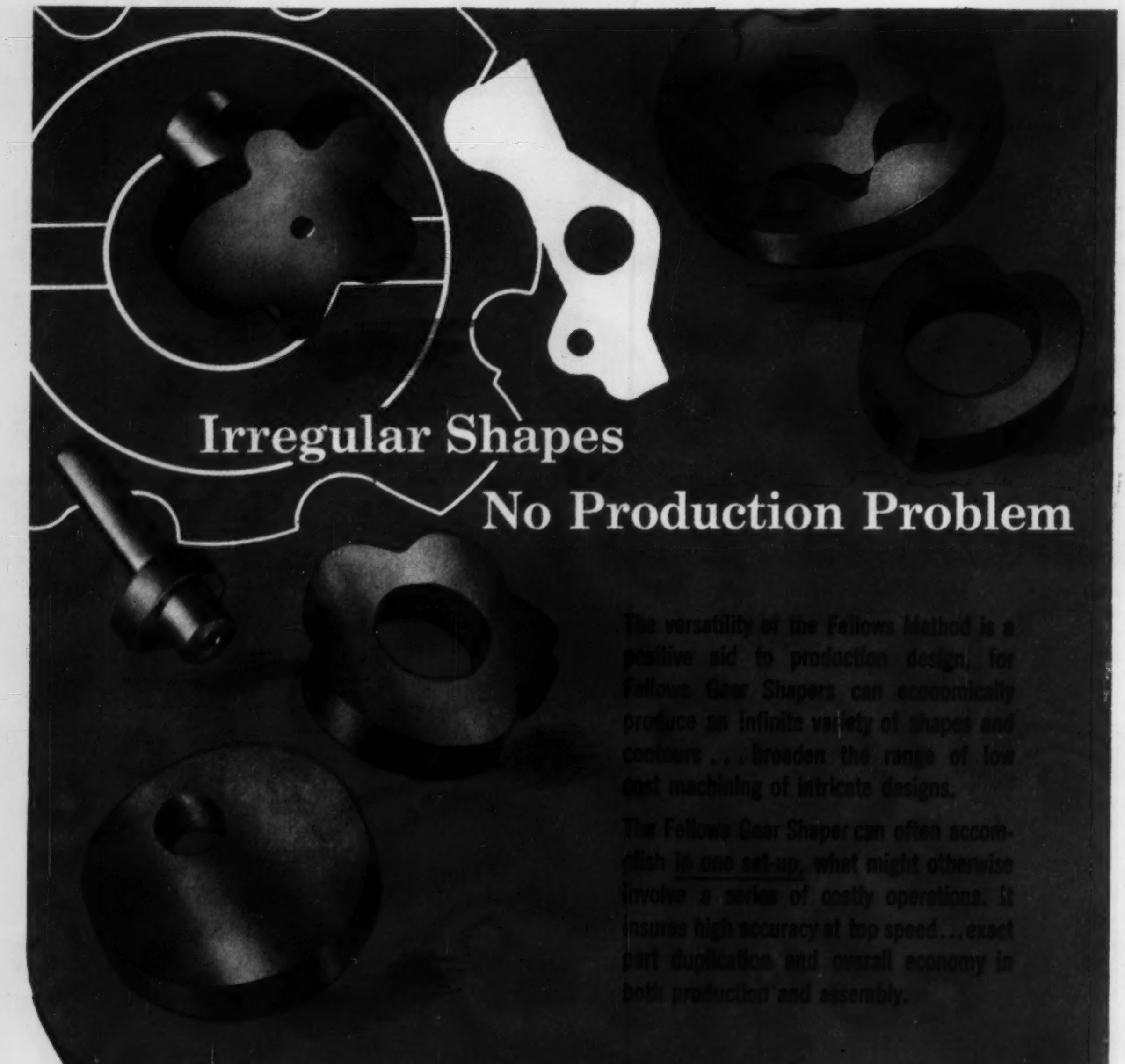
55-3

PETERSON STEELS, INC.
UNION, NEW JERSEY
Detroit, Michigan • Chicago, Illinois



Irregular Shapes No Production Problem

The versatility of the Fellows Method is a positive aid to production design, for Fellows Gear Shapers can economically produce an infinite variety of shapes and contours . . . broaden the range of low cost machining of intricate designs.

The Fellows Gear Shaper can often accomplish in one set-up, what might otherwise involve a series of costly operations. It insures high accuracy at top speed . . . exact part duplication and overall economy in both production and assembly.

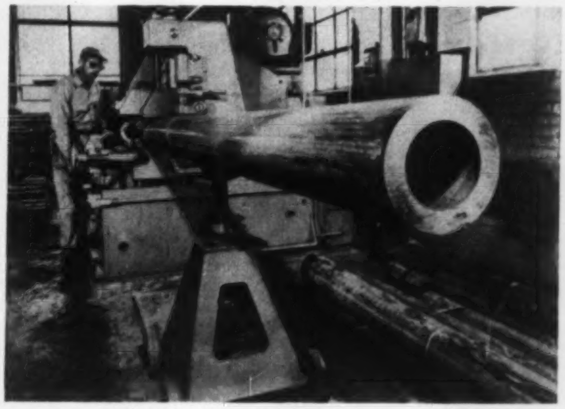
The Art of Generating with a Reciprocating Tool

How the Fellows Method can be economically utilized for the production of many different shapes and parts is explained in "The Art of Generating with a Reciprocating Tool". A copy is yours for the asking!

THE Fellows GEAR SHAPER COMPANY

Head Office and Export Department: 78 River Street, Springfield, Vermont.
Branch Offices: 319 Fisher Bldg., Detroit 2 • 5835 West North Ave., Chicago 39 • 2206 Empire State Bldg., New York 1
6214 West Manchester Ave., Los Angeles 45

Continuous-Cast Bearing Bronzes Come in Larger Sizes



Bearing bronze is available in 44 new, larger sizes—from 5 to 9 in. in diameter. It comes in many foundry alloys and shapes up to 12 ft long.

The process: Molten metal, from an auxiliary melting furnace, is kept at the proper temperature in the casting crucible.

Solidification of the rod or tube takes place in a self-lubricating, water-cooled graphite die. Driving wheels, mounted underneath, withdraw the solidified product continuously at controlled speed.

A traveling saw, illustrated, is engaged at proper intervals to cut uniform lengths.

The gravity-feed, bottom-flow casting method prevents the trapping of dirt and dross. *Write*: Continuous-Cast Products Dept., American Smelting & Refining Co., Barber, N. J.

Front-to-Back Crankshaft Improves Press Design

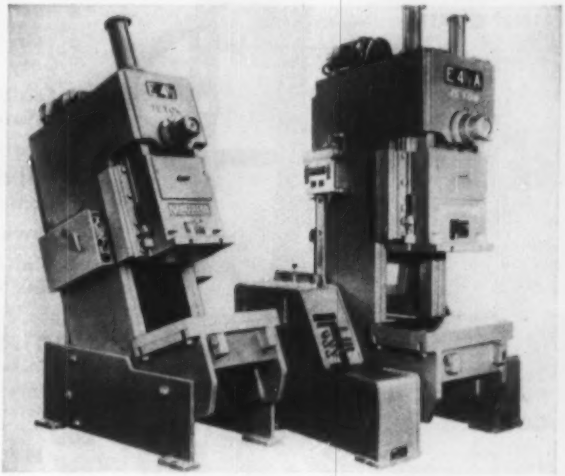
The new, open-back inclinable presses are built in four sizes. Capacities are from 75 to 200 tons; shaft diameters range from 4½ to 7½-in.

Because the rugged front-to-back crankshaft does not require a narrow frame for support, the distance between gibs has been increased. Result: A wider box-type slide contained within the gibbing gives full support to wide dies and resists off-center loading of the press.

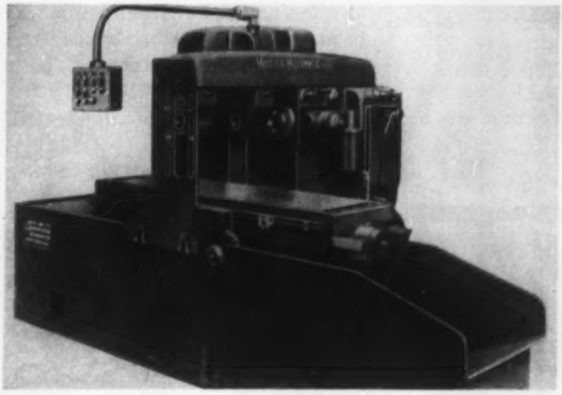
Die life is increased. Multiple V-gibs give efficient guiding, improved bearing action and accurate alignment of the slide. The tendency to cock is minimized.

An electropneumatic friction clutch operates directly on the crankshaft. There are no gears or high speed shaft to start and stop at each engagement.

The main gears are in sealed baths of oil. *Write*: Niagara Machine & Tool Works, 683 Northland Ave., Buffalo 11, N. Y. *Phone*: Taylor 4070



Milling Machine Spindle Speeds Range from 25 to 1230 Rpm



Speeds and feeds of this bed-type milling machine provide fast cycles and high production.

Table feeds are 1 to 81 in. a minute. Rapid traverse of the table is 243 in. a minute. The spindle motor has 25 hp at 1800 rpm.

An involute spline on the spindle gives efficient power transmission regardless of quill position.

The quill diameter is 8¼-in.; its adjustment is 6 in. Even when fully extended, more quill remains in the housing than is extended.

The gear train is enclosed. Helical change gears give smooth and quiet power transmission. Gears are of heat treated alloy steel. *Write*: Machinery Mfg. Division, Motch & Merryweather Machinery Co., 888 E. 70th St., Cleveland 3, O. *Phone*: Utah 1-1515

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FLEXIBLE LINK CHAIN

PUSH-BUTTON CONTROL

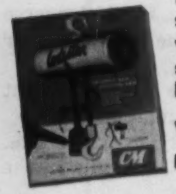
FEATURING:

- Push Button Control
- Self-Adjusting Heavy Duty Brake
- Sealed-in Lifetime Lubrication
- Overload Protection
- Full Enclosed Components
- Lowest Headroom
- "CM-Alloy" Flexible Link Chain

CAPACITIES: from ¼ to 1 ton. Single and 3 phase. ¼ ton model weighs only 51 pounds.

$149.50 and up

Built to serve you without costly maintenance



Lodestar is the first truly "heavy duty" version of the small electric hoist. The CM Lodestar is designed to operate without costly maintenance or interruptions in your work schedules. The initial cost is practically your only cost with a Lodestar... an extremely low cost indeed!

WRITE US or call your CM distributor for literature, prices and quick delivery from stock.

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HOISTS AND CHAIN

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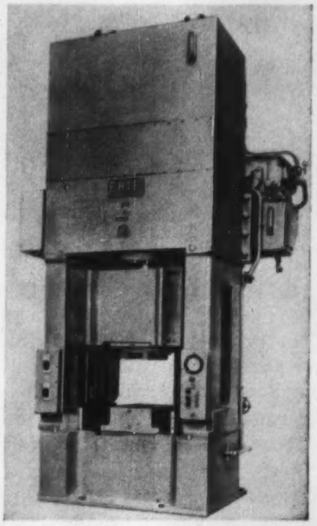
Columbus McKinnon Chain Corporation
Tonawanda, New York
REGIONAL OFFICES: NEW YORK • CHICAGO • CLEVELAND
In Canada: McKinnon Columbus Chain Limited, St. Catharines, Ontario

NEW **PRODUCTS and equipment**

Hydraulic Forging Press

This 1000-ton capacity machine completes a 6-in. stroke cycle in 4 seconds.

A special compression and decompression feature combines speed control with automatic pressure and precision reversal. A 1 to 1 guide ratio insures extreme accuracy.

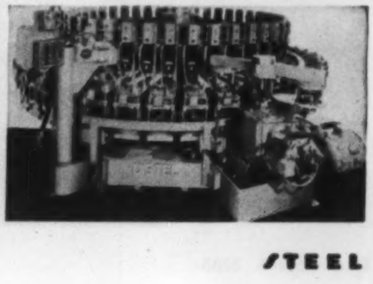


The press is of rigid side-housing construction with preshrunk tierods. It is self-contained and can be arranged for semiautomatic single cycle or pushbutton operation. *Write*: Hydraulic Press Division, Erie Foundry Co., W. 12th St., Erie 6, Pa. *Phone*: 2-6754

Brake Band Production

Two machines speed production of automatic transmission brake bands. One provides constant roll forming and cutoff from coil stock. It makes perfect steel bands; the radius is held constant at both ends.

The other machine, illustrated,



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heats food fast!

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shine stays bright!

SuVeneer Stainless Clad Metal provides a low-carbon steel core for fast, even heating . . . plus heavy stainless steel on each side for *the ever-bright beauty that cleans with a wipe.*

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Superior Steel
CORPORATION
CARNEGIE, PENNSYLVANIA

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Six out of 10 cars in this lot at Standard Pressed Steel, Jenkintown, Penna., are Granodized with Granodine® before painting. Why do most automobile manufacturers use this crystalline zinc phosphate undercoating? The reasons are simple. Granodine provides a lasting bond between paint and steel. It forms an inert barrier against rust. It assures a fine and durable paint finish.

Automobile manufacturers depend upon Granodizing with Granodine, too, because of the technical assistance offered by ACP. Not only do we supply the chemicals — we also put them to work and, what's more, keep them working effectively.

Your sheet steel products also can have these extra sales features. Investigate the advantages of Granodizing with Granodine. Contact your nearest ACP sales office or write us.

AMERICAN CHEMICAL PAINT COMPANY, Ambler 19, Pa.

DETROIT, MICHIGAN **NILES, CALIFORNIA** **WINDSOR, ONTARIO**

CHEMICALS
ACP
PROCESSES

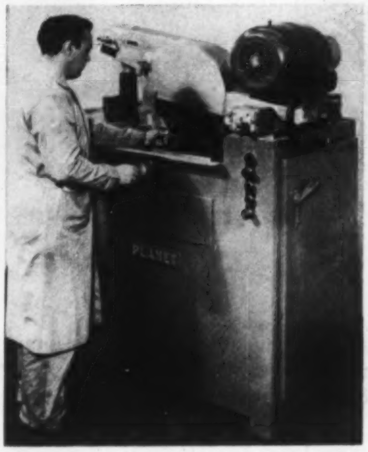
CARNEGIE, PENNSYLVANIA

bonds brake linings to steel bands electrically with low voltage heating elements. Rate: 360 an hour. This 42-station rotating machine has a ball bearing 6 ft in diameter to provide stability and eliminate vibration.

The machine will operate even if one or more of its stations is shut down. *Write*: Distel Tool & Machine Co., 2585 Beaufait, Detroit 7, Mich. *Phone*: Walnut 1-3071

Slot Grinding

Slots up to ½-in. wide and 1 in. or more deep can be ground by this machine.



Finished slots are ground to a surface finish of 5 microinches or less. Total variations in flatness and parallelism between the opposing faces of the slots are held to less than 0.003-in.

A two-speed motor uses 12,000 fpm for roughing, 6000 fpm for finishing.

Coolant guarding is so arranged that grinding is done under water. This gives fine finish and accuracy with relatively coarse, rubber-bonded, cutoff wheels. *Write*: Planet Products Corp., Cincinnati 27, O. *Phone*: Bramble 1-6000

Needle Thrust Bearings

Needle rollers, made of high carbon, chrome steel are through hardened to Rc 60 minimum. To give even load distribution, the

MEMO
THE TORRINGTON COMPANY

a manufacturer checks the benefits of STANLEY STEEL STRAPPING

☑ Faster Handling
☑ Greater Protection
☑ Reduced Costs

A change for the better . . . at the Torrington Company, Torrington, Conn., now that the Stanley "Uni-Tie" Steel Strapping System is used to help pack many millions of needle rollers each month for shipment to the auto industry. Formerly, the needle rollers were put in canvas bags. Four to six of these bags were then packed in a wooden box.

Now the needle bearings are packed in vacuum-sealed cans. Twenty cans are placed in cartons and "Uni-Tied" with Stanley Steel Strapping to an expendable pallet.

The Stanley method of "Uni-Tieing" on pallets means fewer packs. Handling and packing material costs are reduced. Handling and storage are easier . . . faster. The package reinforcement supplied by Stanley Steel Strapping assures maximum in-transit protection.

Is a change in ***your*** packing procedure called for? The Stanley Steel Strapping Specialist will analyze your methods and suggest improvements. Is POWER PACKING ***your*** requirement? Stanley has a complete line of steel strapping power and hand tools.

Mail coupon for catalog and to arrange an on-the-spot demonstration.

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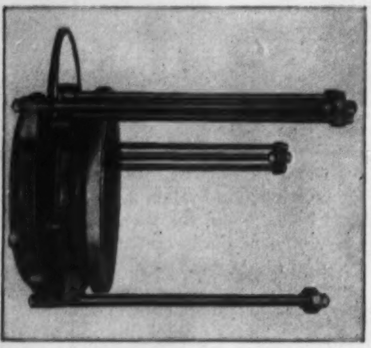
(Advertisement)

Gas Main Safety

Bailey Thermal Expansion Goggle Valves form tight, leak-proof seals to close mains from 36" to 120" in diameter

AN UNFAILING force of nature—the linear expansion and contraction of steel—is being used to increase steel mill safety. The larger sized gas mains are closed safely and efficiently by Bailey Thermal Expansion Goggle Valves. In them the powerful force exerted by the linear expansion of three steel tubes is used to free or clamp the goggle plate—providing an absolutely gas-tight seal.

In operation, steam is passed into the tubes, which are spaced evenly around and perpendicular to the rigid steel flanges of the valve. The resulting expansion frees the heavy goggle plate so it may be swung to the open or closed position. When the steam is shut off, contraction of the tubes takes place, closing the flanges tightly against the goggle plate. Since both sides of the plate are machined to conform to the machined edges of the valve flange, Bailey Valves are leak-proof in both open and closed positions.



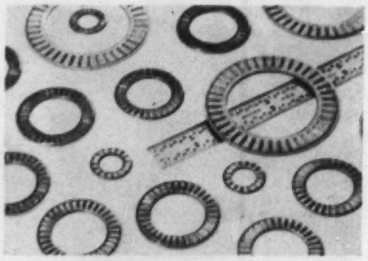
Bailey Thermal Expansion Goggle Valves are produced in diameters from 36" to 120".

Sound design and precision manufacture are combined in these valves to assure the ultimate in safety and reliability. They have been thoroughly proved on the gas mains of blast furnaces, gas washers and boiler plants. Bailey Thermal Expansion Goggle Valves are completely dependable in hot or cold, dirty or clean gas mains.

WILLIAM M. Bailey COMPANY
1221 Banksville Road
Pittsburgh 16, Pa.

rollers are precision ground and lapped to a tolerance of 0.0002-in. on the diameter.

The thrust bearings come in four sizes: ½-in. bore x 15/16-in. OD; ¾ x 1¼-in.; 1 x 1 9/16-in.; and 1¼ x 1 15/16-in. The bores give a running fit on standard shafts.



The roller diameter (0.078-in.) is no thicker than an ordinary thrust washer. The bearing is easily adaptable in automatic transmissions. *Write*: Torrington Co., Torrington, Conn. *Phone*: Hunter 2-4441

Electric Motors

Improved features and performance are engineered into a line of motors built to the new NEMA dimensions.

The line will extend to 40 hp, 3600 rpm. Motors are more compact than previous types and give the same horsepower in less space and with reduced weights.

A low air opening in the end bell protects the winding from liquids and abrasive dust.

The previous design of NEMA frames 203 through 586 is still available. *Write*: Electro Dynamic Division, General Dynamics Corp., Bayonne, N. J. *Phone*: Federal 9-0420

Strip Steel Inspection

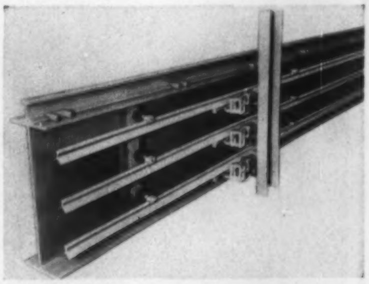
A redesigned pinhole detector can spot holes 1 mm in diameter in opaque strip 10 mm or less thick.

It operates at strip speeds of 2000 fpm, and scans strips up to 48-in. wide.

The light source is a single mercury lamp with a 25,000 ft-candle output. The increased amount of light gives a high sensitivity to angular and vertical holes. *Write*: General Electric Co., Schenectady 5, N. Y. *Phone*: 4-2211

Aluminum Conductors

All overhead traveling cranes made by this company now use inverted-Y conductors. Sliding shoe collectors handle the heavy current.



The conductors are heavy aluminum extrusions, available in 300, 500, 1000 or more amperes.

Current collectors are built to give long trouble-free service in tough applications, such as in steel mills and foundries.

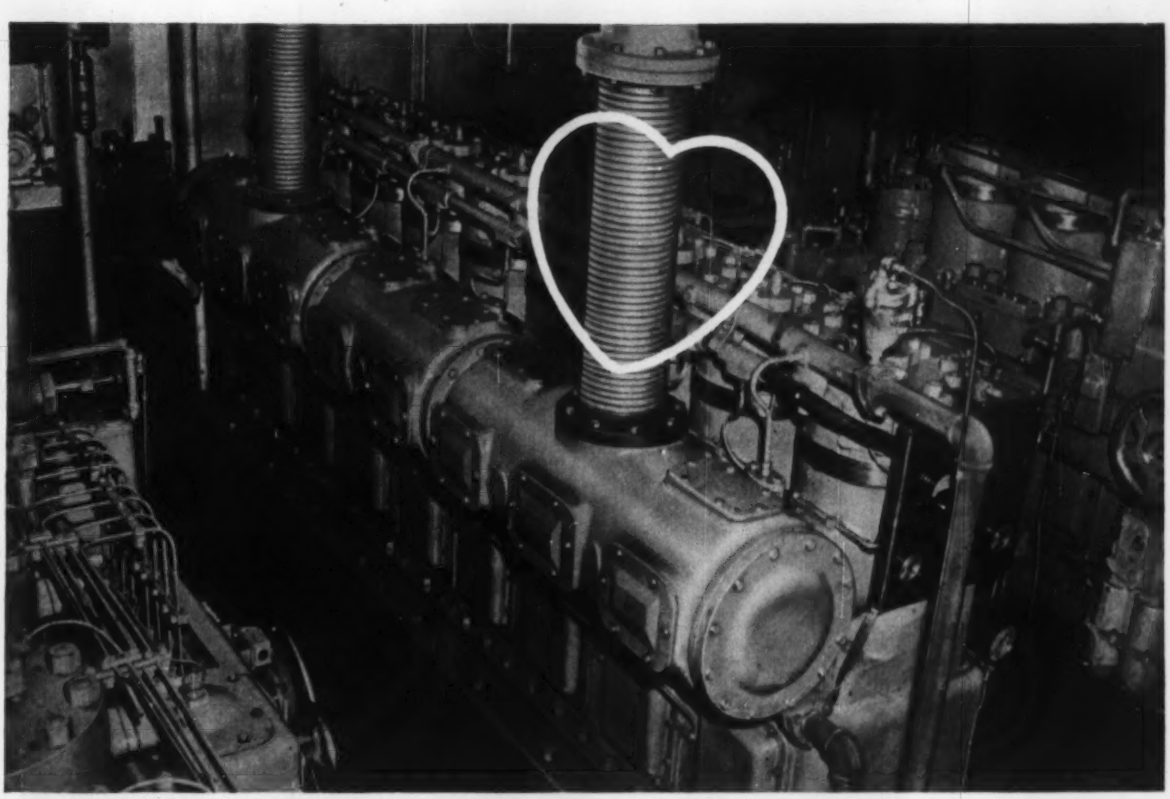
Installation is easy. *Write*: Cleveland Crane & Engineering Co., E. 289 St., Wickliffe, O. *Phone*: Wickliffe 3-3700

Iron Powder Electrode

Improved Fleetweld 47 is an electrode for high-speed welding of mild steel in all positions. Either direct or alternating current can be used.

Powdered iron in the coating gives higher deposition rates. Result: 10 to 30 per cent higher welding speeds. The coating also produces greater footage per electrode.

Bead appearance is smooth and clean. Spatter is minimum. The arc is smooth, soft and stable in



GIVES HORSEPOWER THE *P-U-R-R* OF A KITTEN

Flexible tubing reduces Diesel vibrations... Absorbs thermal expansion

Ever been around while a smoothly-running Diesel warmed up . . . and then, in a few minutes, began a series of vibrations? It's a condition often traced to the type of piping used on air intake and exhaust lines.

Such vibrations can be prevented . . . or cured . . . with Penflex four-wall interlocked tubing, which is flexible enough to absorb the vibration . . . tight enough to prevent any leakage of air and gases. It has other important features, too . . . it "gives"—instead of breaking with thermal expansion.

Afloat or ashore, Penflex tubing finds many applications on Diesel engines . . . on exhausts and air intakes . . . fuel oil and starting air lines . . . lubricating oil and water circulating lines . . . as a partial listing.

Penflex makes a complete line of four-wall, interlocking and seamless welded corrugated tubing, including braided-wire or rubber covered types . . . ⅛" to 24" I.D., in materials suited to various conditions.

"Flexineering," the science of selecting the tubing of the right size, weight, type and construction for these numerous applications, will be explained to you by Penflex engineers. Or you will find our "Flexineering" booklet both helpful and interesting. Send for your copy today.

Pennsylvania Flexible Metallic Tubing Company, Inc., 7219 Powers Lane, Philadelphia 42, Penna. • *Branch Sales Offices:* Boston New York • Chicago • Houston • Cleveland and Distributors in Principal Cities

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A Big job

It pays to place big jobs in the hands of responsible people. In our plant there are proper facilities to build large pieces of industrial equipment.

The job can be completed without lost time and inefficiency caused by subletting parts. Sun Ship can do the job from beginning to end. Plate work, forge work, structural shape bending, stress relieving, X-raying, machining.

Water or rail shipments.

No job too big.

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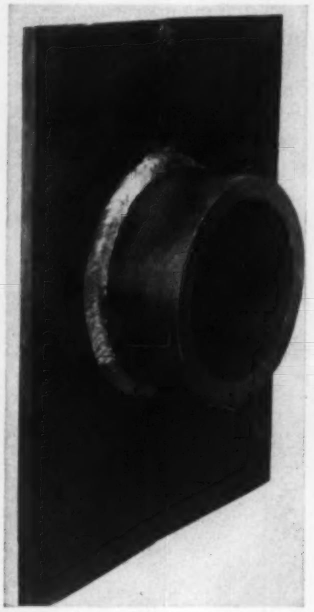
all positions and has no tendency to stick. Either the drag or short-arc technique can be used.



Electrode sizes are from ⅛ to 5/16-in. in diameter. *Write*: Lincoln Electric Co., 22801 St. Clair Ave., Cleveland 17, O. *Phone*: Ivanhoe 1-8100

Plug Gages

Tungsten carbide plug gages are said to have an accurate life up to 50 times greater than other gages.

Fewer scrap parts result because it is not necessary to add an oversize tolerance to "go" members.

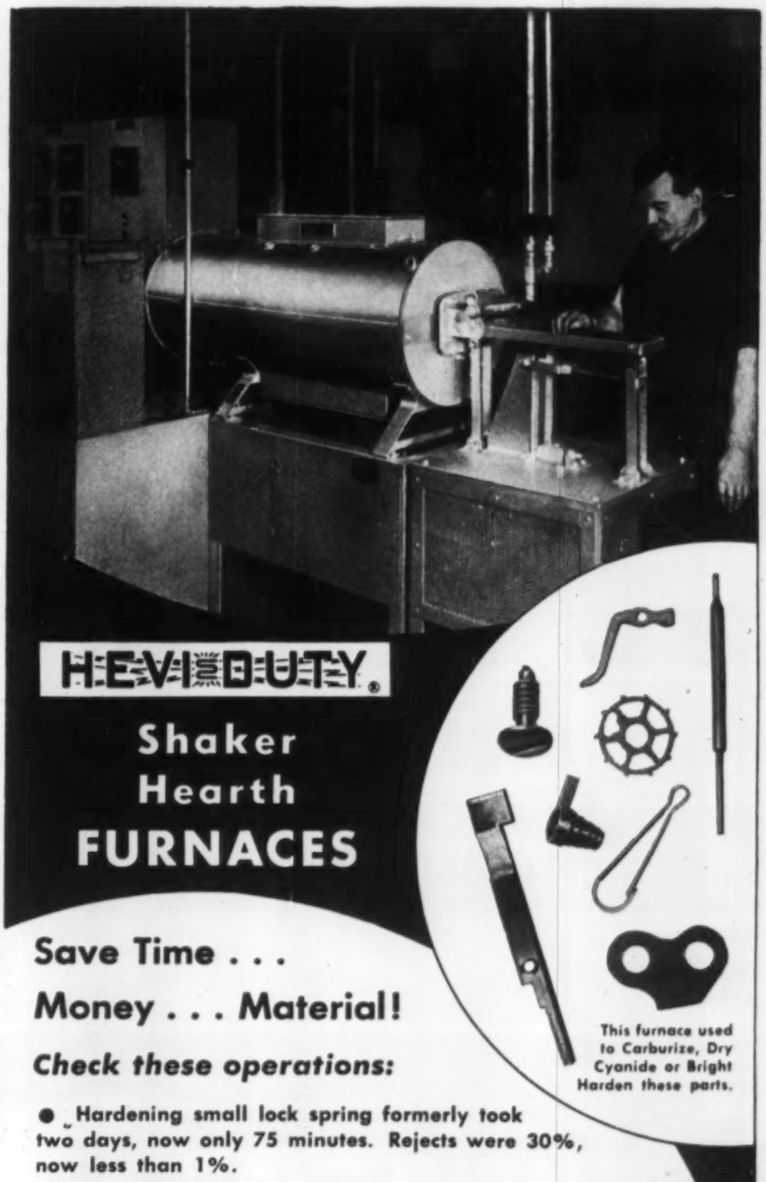
The tungsten carbide resists corrosion. It is nonmagnetic, not apt to pick up foreign materials and mar the work.

Gage sizes range from 0.025 to 1.010-in. *Write*: Regal Division, Beloit Tool Corp., Beloit, Wis. *Phone*: Emerson 5-8878

Air Press

Increased vertical height, throat depth and ram stroke are provided by this double-acting air press.

Air cylinders support unlimited upper die weights and permit faster operating cycles. The ram



HEVI DUTY

Shaker Hearth FURNACES

This furnace used to Carburize, Dry Cyanide or Bright Harden these parts.

Save Time . . . Money . . . Material!

Check these operations:

- Hardening small lock spring formerly took two days, now only 75 minutes. Rejects were 30%, now less than 1%.
- $12,000 saved the first year at a large electric applicance manufacturer; almost three times the original cost of the furnace.
- Cleaning and pickling eliminated because of "Bright" case hardening at a business machine manufacturer.
- Heat treating costs cut in half at a chain manufacturer due to the ease of operation.
- Stainless steel springs "Bright" hardened without distortion because the parts are individually heated in a protective atmosphere and then are dropped directly into the oil quench.

Learn more about this modern production tool and the way it can help you. Write for Bulletin HD 850.

HEVI DUTY ELECTRIC COMPANY

MILWAUKEE 1, WISCONSIN

Heat Treating Furnaces... Electric Exclusively

Dry Type Transformers *Constant Current Regulators*

PRICE LIST
ON HANNIFIN STOCK HYDRAULIC PRESSES

1-TON........................$ 552
2-TON........................$ 627
5-TON........................$1,286
8-TON........................$1,581
10-TON........................$1,855
25-TON........................$3,681

Prices complete with motors and starters F.O.B. our press plant, St. Marys, Ohio, subject to change without notice.

DELIVERY FROM STOCK

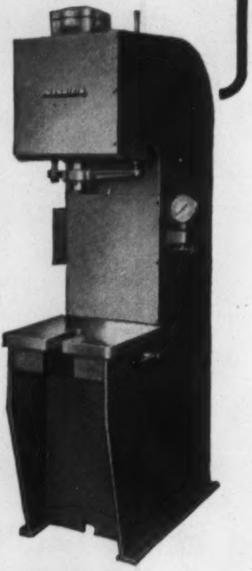
Demand for these popular presses is so consistent we are able to produce them in quantity and pass the savings along to you.

Construction-wise and quality-wise these small general-purpose presses are identical to the larger Hannifin presses, up to 150 tons. Special, optional controls when needed.

WRITE for complete information on the Hannifin Hydraulic Press you're interested in.

HANNIFIN

HANNIFIN CORPORATION, 523 S. WOLF ROAD, DES PLAINES, ILLINOIS



Haul Castings the Economical Sterling Way!

These all-steel, heavy duty trucks come in handy for hauling castings to and from cleaning room. With roller bearing wheels and ball bearing swivel casters, they glide along smoothly, maneuver easily. Save both time and labor. Capacity 2,000 lbs. Sturdy, reinforced welded construction. Write for literature.

STERLING WHEELBARROW CO., • Milwaukee 14, Wis., U.S.A.

Sterling

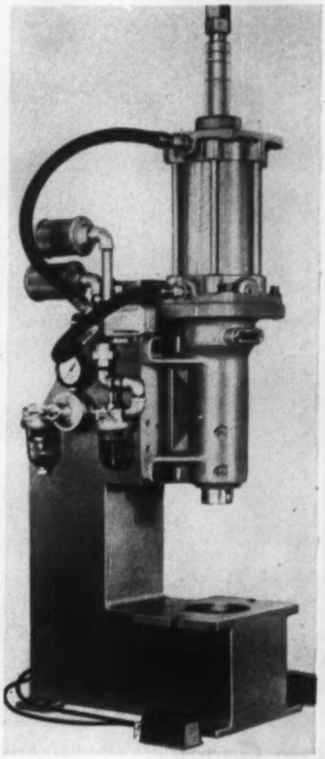
FOUNDRY EQUIPMENT

A 8530-⅓

At Your Service!

is supported and guided independently of the cylinder piston rod and is keyed to prevent turning.

A hole through the platen is provided for operations needing punch slug or workpiece clearance.

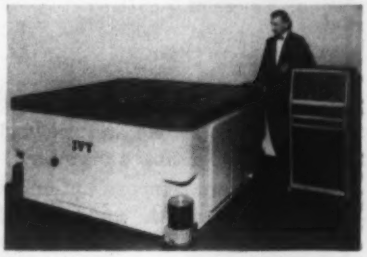


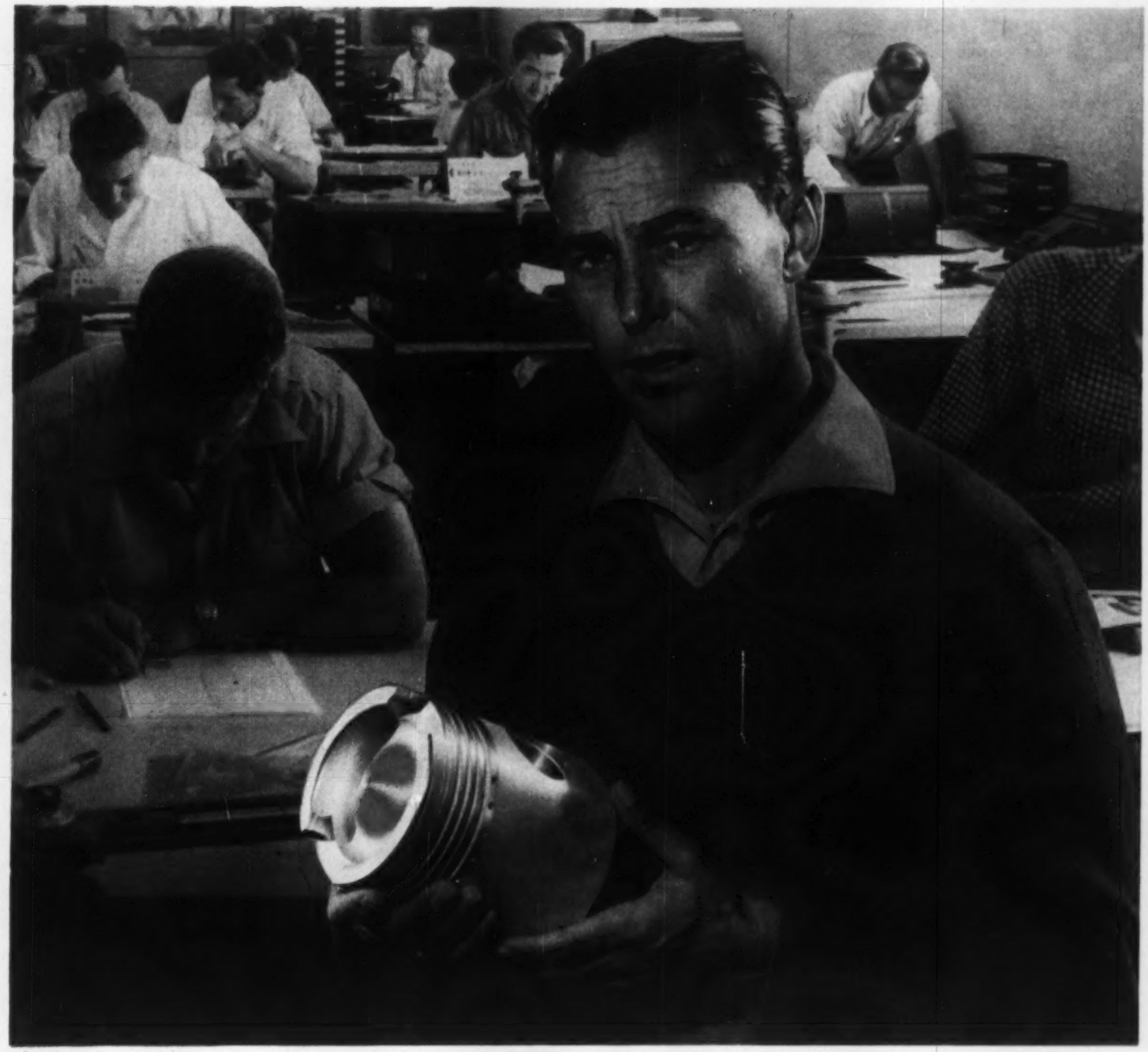
Standard equipment includes lubricator, filter, regulator, regulating gage and two mufflers. *Write*: Famco Machine Co., 3100 Sheridan Rd., Kenosha, Wis. *Phone*: Olympic 4-3516

Fatigue Testing

Here is a constant force machine for multirange fatigue testing. Various models have capacities from 200 to 120,000 lb.

The multirange feature has two test stations. One is for high





"We always had them cast; but we found Harvey Aluminum forgings made better pistons"

Four important things happened when this manufacturer switched from cast aluminum to Harvey Press Forgings. First . . . machining operations were sharply reduced. Second . . . the dense, fine grain structure cut rejects. Third . . . scrap loss dropped. Fourth . . . the product was improved, for high-strength, press-forged pistons assured longer engine life. The whole story, summed up, is one of lower manufacturing costs, better product, higher profits. Harvey Press Forgings can help your own product the same way. A Harvey Engineer will be glad to show you how. The first step is to send *today* for our latest brochure, "Aluminum Forgings."

Aluminum Forgings
HARVEY

Harvey is a leading independent producer of aluminum extrusions in all alloys and all sizes, special extrusions, press forgings, hollow sections, structurals, rod and bar, forging stock, pipe, tube, impact extrusions, aluminum screw machine products and related products. Also similar products in alloy steel and titanium on application.

Making the most of aluminum . . . for everyone

HARVEY Aluminum

HARVEY ALUMINUM SALES, INC.
TORRANCE, CALIFORNIA
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force; the other is for high amplitude operation.

A torque bar provides for high amplitude and permits the machine to be used with heavy test pieces and fixtures. Errors from temperature changes are eliminated.

Settings for both static and dynamic forces are calibrated in pounds. The static force is held constant by an electronic controller.

The entire unit is seismically mounted. *Write*: Ivy Co., Norwalk, Conn. *Phone*: Temple 8-5528

Pin Plugs

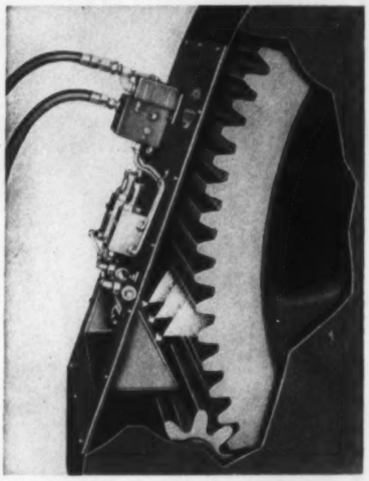
Here is a solution to the problem of sealing drilled holes.

The cylindrical pin plug is expanded mechanically after it is inserted. This is done by a pin which goes into a tapered, reamed hole in the center of the pin plug.

The result is an interference fit of 0.0020-in. Small grooves on the outside diameter of the pin plug each form their own seal and retaining ring. *Write*: Lee Co., Wesley Ave., Westbrook, Conn.

Spray Panel Lubrication

Bull, girth, spur and herringbone gears are spray lubricated by this self-contained panel. The panel is fastened to gear housings or framework and sprays the lubricant directly to the pressure side of the gear teeth.



The panels are about 2 x 3 ft and have stainless steel spray valves with built-in nozzles. Measuring valves distribute the lubricant under pressure to the spray valves where it is mixed with air to form a penetrating spray. *Write*: Farval Corp., 3249 E. 80th St., Cleveland 4, O. *Phone*: Vulcan 3-4560

Ram Trucks

A new series has coil handling capacities from 20,000 to 80,000 lb.

The trucks have dual power plants, with separate drive motors and reduction units for each pair of drive wheels. Drive motors are inside the frame. Narrow design permits operation in confined areas.

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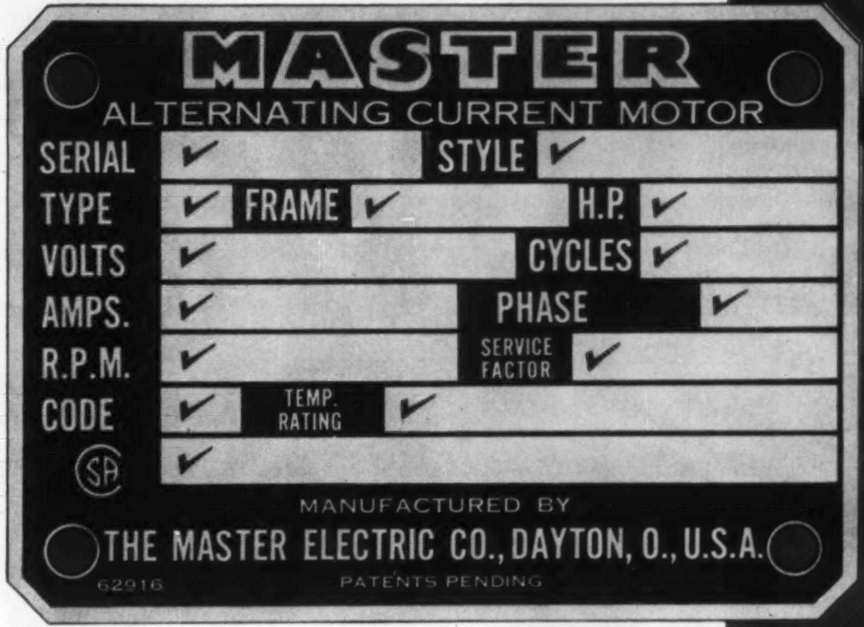

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CODE ✓ TEMP. RATING ✓
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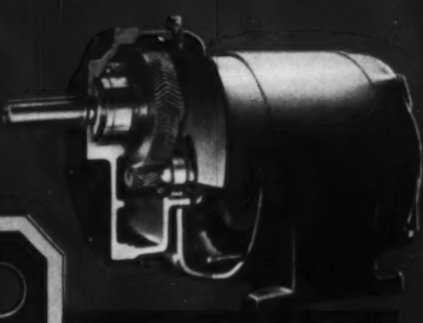
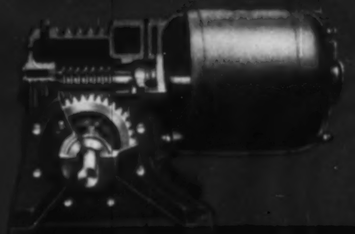


Parallel Shaft Gearmotors



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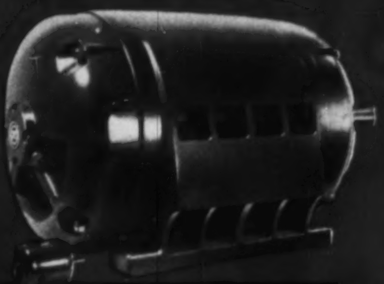
Unibrake Motors

Speedrangers



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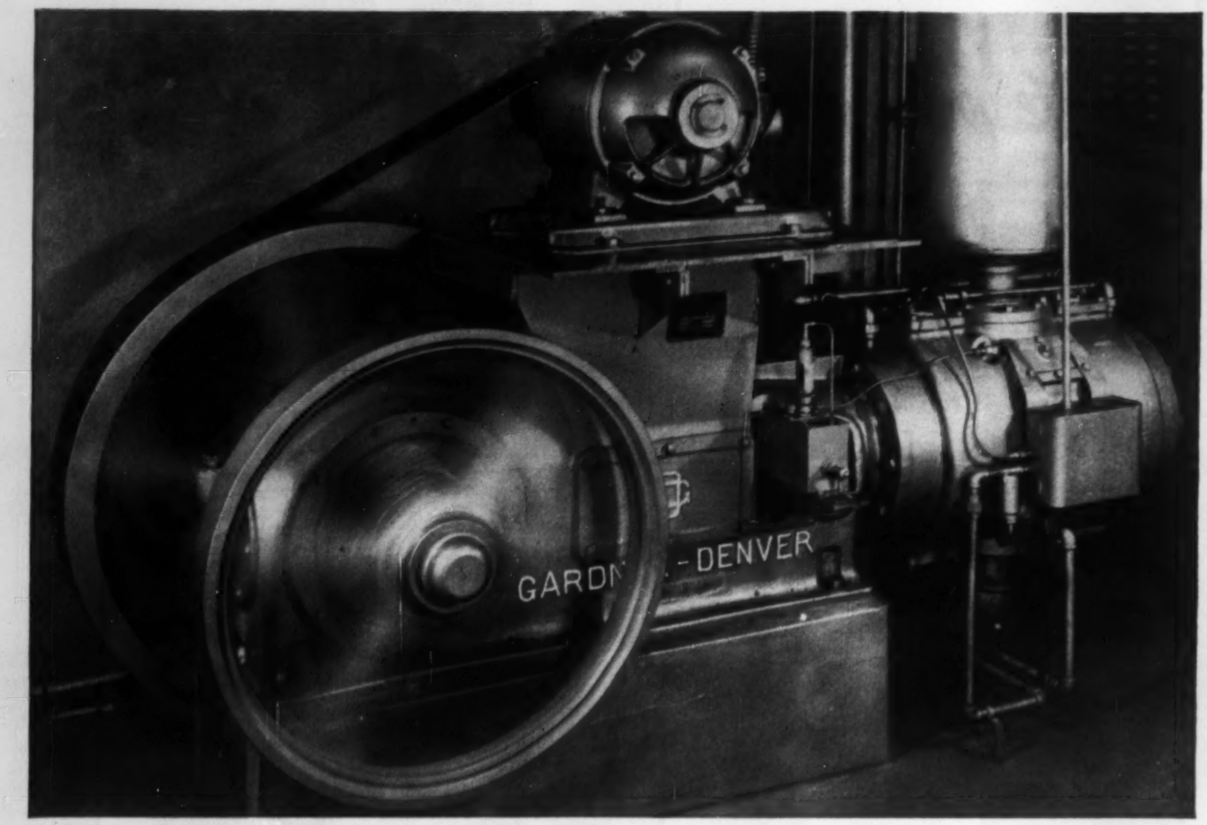
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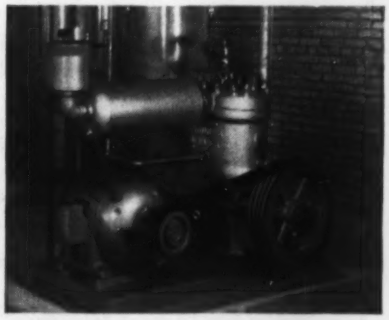

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14 Curity Avenue, Toronto 16, Ontario

NEW Literature

Write directly to the company for a copy

Materials Handling

Here are data on balance-type trucks for trailer-train use, two-wheeled trucks and platform trucks—bulletin 56G, 12 pages. Nutting Truck & Caster Co., 1201 W. Division St., Faribault, Minn.

Metal Forming

This illustrated booklet explains the principles of forming metal parts by expanding, shrinking and roll forming—20 pages. Dept. 88-1 Grotnes Machine Works, 5454 N. Wolcott Ave., Chicago 40, Ill.

Arc Welding

Carbon-dioxide shielded welding with consumable electrodes is described—12 pages. Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y.

Controls

Hand switches, a foot switch, limit switches, control boxes and clutch actuating equipment are covered—catalog 65, 12 pages. Micro Switch Division, Minneapolis-Honeywell Regulator Co., Freeport, Ill.

Dial Gages

Dial indicator gages for checking all types of dimensional conditions are shown—48 pages. Low friction dial indicators are pictured—24 pages. Federal Products Corp., 1144 Eddy St., Providence 1, R. I.

Powdered Brass

The chemical and physical properties of powdered brass alloys are charted—1 page. Dixon Sintaloy Inc., subsidiary of Joseph Dixon Crucible Co., 535 Hope St., Stamford, Conn.

Platform Truck

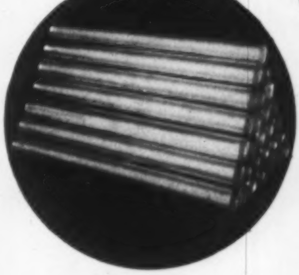
An electric high-lift truck for use in cramped areas is described—bulletin 551-3, 4 pages. Barrett-Cravens Co., 630 Dundee Rd., Northbrook, Ill.

Stainless Steel

This data sheet gives the mechanical properties of chromium-nickel-molybdenum stainless steel types 316, 316L, 317 and 317L. Sales Dept., Allegheny Ludlum Steel Corp., 2020 Oliver Bldg., Pittsburgh 22, Pa.

Furnace Equipment

Here is information on muffles, furnace trays and fixtures, retorts and pit-type furnace equipment, salt bath equipment, pickling and plating equipment made of heat and cor-



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Division of Gregory Industries, Inc.
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rosion resistant alloys—catalog G-10, 32 pages. Rolock Inc., 1350 Kings Highway, Fairfield, Conn.

Plastics and Resins

With this reference file you can check on the properties of plastics and resins and their ability to be formed or processed—12 pages. Bakelite Co., division of Union Carbide & Carbon Corp., 300 Madison Ave., New York 17, N. Y.

Radiant Heat Ovens

This folder tells how to build infrared ovens for heating, baking or drying. Engineered radiant oven components are used. Fostoria Pressed Steel Co., Fostoria, O.

Inclinable Presses

Both standard and enclosed presses (from 10 to 200 tons) are described —catalog 2D, 32 pages. E. W. Bliss Co., Canton, O.

Flexible Couplings

Case histories show the solution of power transmission problems—12 pages. American Flexible Coupling Co., 1801 Pittsburgh Ave., Erie 1, Pa.

Colloidal Dispersions

Colloidal graphite and molybdenum disulphide cut costs in forging, wire drawing, extrusion, piercing, punching, spinning, cutting and other metalworking operations. Here's how—bulletin 426, 4 pages. Acheson Colloids Co., unit of Acheson Industries Inc., Port Huron, Mich.

Dynamic Balancing

Here is information on balancing rotating parts weighing from 4 oz to 8 tons. Bear Mfg. Co., Rock Island, Ill.

Gage Blocks

Here's how light waves are used to control the accuracy of gage blocks —44 pages. Engis Equipment Co., 431 S. Dearborn St., Chicago 5, Ill.

Double-Action Presses

Straight-side presses with capacities from 200 to 2000 tons are depicted—catalog D, 28 pages. Danly Machine Specialties Inc., 4358 W. Roosevelt Rd., Chicago 50, Ill.

Cast Iron Alloys

Recommended uses of Vancoram alloys in iron foundries are given. Vanadium Corp. of America, 420 Lexington Ave., New York 17, N. Y.

Wire Mesh Containers

Ways to cut materials handling costs with steel wire mesh cargo containers, pallets and bulkheads are il-

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SANDUSKY FOUNDRY AND MACHINE CO., Sandusky, Ohio

lustrated by case histories—28 pages. Pittsburgh Steel Products Co., subsidiary of Pittsburgh Steel Co., Grant Bldg., Pittsburgh 30, Pa.

Vacuum Furnaces

Catalog 552 (8 pages) covers the advantages and features of vacuum melting, heat treating, sintering, annealing, brazing, degassing and purification. High Vacuum Equipment Corp., 349 Lincoln St., Hingham, Mass.

Grinding Wheels

All types of grinding wheels are discussed in catalog 5E, 30 pages. Peninsular Grinding Wheel Division, Abrasive & Metal Products Co., 729 Meldrum Ave., Detroit 7, Mich.

Nonferrous Refractories

Super refractories for nonferrous melting furnaces are described—4 pages. Refractories Division, Carborundum Co., Perth Amboy, N. J.

Work-Holding Tools

Catalog 9155 (10 pages) has information on vises for angle machining, lathe fixtures and safety work holders. Universal Vise & Tool Co., Parma, Mich.

Granite Surface Plates

This is the story of how black granite surface plates are made—67 pages. Collins Microflat Co., 2326 E. Eighth St., Los Angeles 21, Calif.

Die Springs

Tool and die makers now can select springs to suit the pressure needed—bulletin 72, 10 pages. Die Supply Division, E. W. Bliss Co., 1400 Brookpark Rd., Cleveland 9, O.

Abrasive Discs

Here is a chart of factors influencing the selection of abrasive discs and wheels. Also covered: Abrasives made for flat grinding needs—catalog AC-55, 20 pages. Gardner Machine Co., Beloit, Wis.

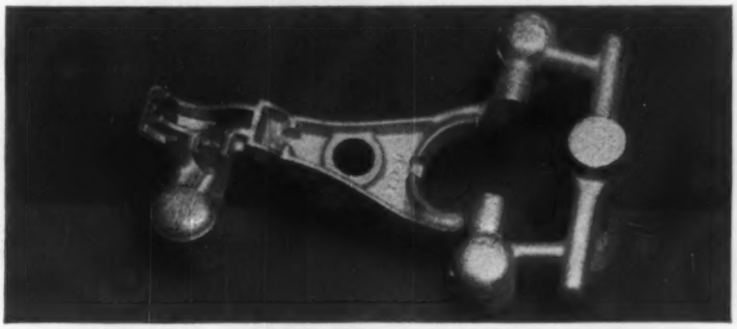
Fire Protection

Carbon dioxide, dry chemical, foam, water and vaporizing liquid fire extinguishers for industrial protection are described — 12 pages. Walter Kidde & Co. Inc., Belleville 9, N. J.

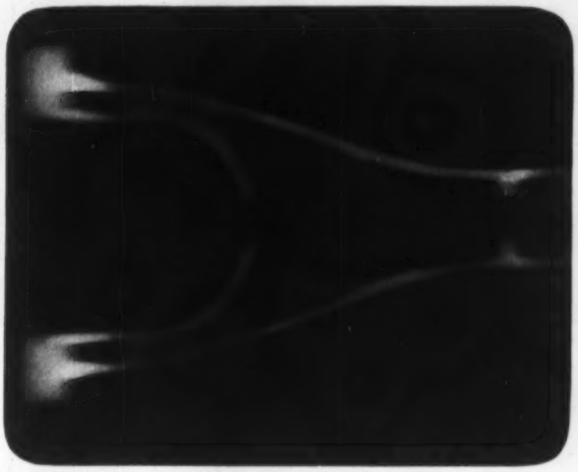
Beryllium

Extruded rod and bar stock and seamless beryllium-copper tubing are described. Characteristics are given for beryllium-copper, beryllium-aluminum and beryllium-nickel alloys—20 pages. Beryllium Corp., Reading, Pa.

Shrink steals strength — and profits



— RADIOGRAPHY points the way to avoid it



THIS steel fork lever was designed to take a specific load. Would it hold up? Not if shrinkage had robbed its strength.

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This is typical of the ways radiography helps the foundryman make sure only satisfactory work is delivered and so builds a reputation for high-quality castings.

* * *

If you'd like to know how it can improve your own operations, talk it over with your x-ray dealer. Or, if you like, write us for a free copy of "Radiography as a Foundry Tool."

EASTMAN KODAK COMPANY, X-RAY DIVISION, ROCHESTER 4, N. Y.

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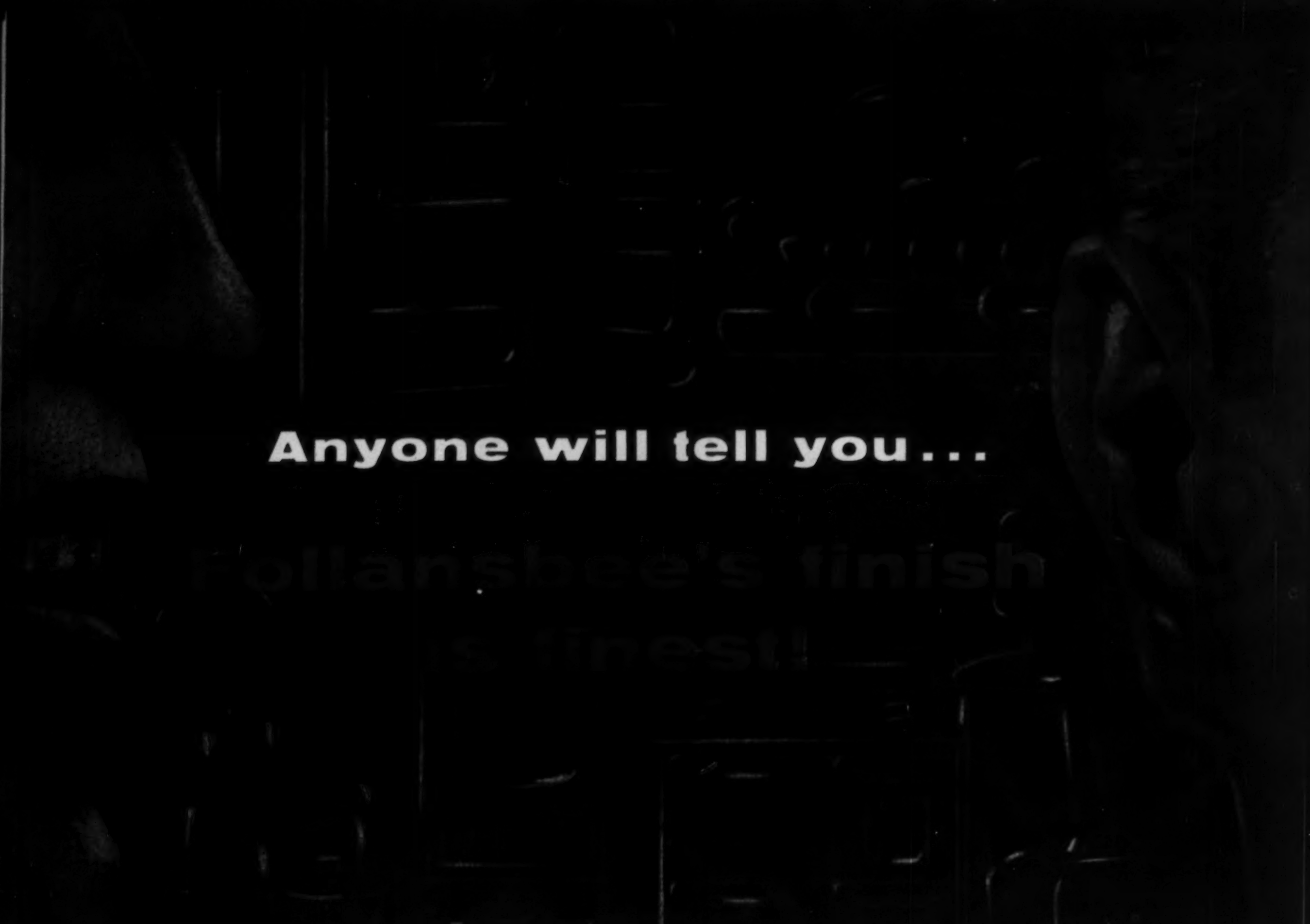

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STEEL

December 5, 1955

Market Outlook

A YEAR of capacity operations for the steel industry is rapidly shaping up for 1956.

You can see that by the way customers are lining up business for next year. Some of the leading fabricators of structural shapes are booked nine and ten months ahead. Railroads continue to order freight cars. Order plans for the final two months of 1955 total 87,500 cars—more than double this year's output and far above the 57,000 cars on order Nov. 1. Production in 1955 is expected to total 37,500 cars.

GETTING IN LINE— Oil well drillers are attempting already to line up their midsummer steel requirements. Not only do they expect their needs to be high but they anticipate strong competition for steel.

Farm equipment makers view 1956 prospects with enthusiasm. Their plans include increased output of their lines and more aggressive selling.

UNFINISHED BUSINESS— Further assurance of full order books for the steel producers is a substantial carry-over of orders from 1955—the range is from one to two months of orders, depending on the product and the producer.

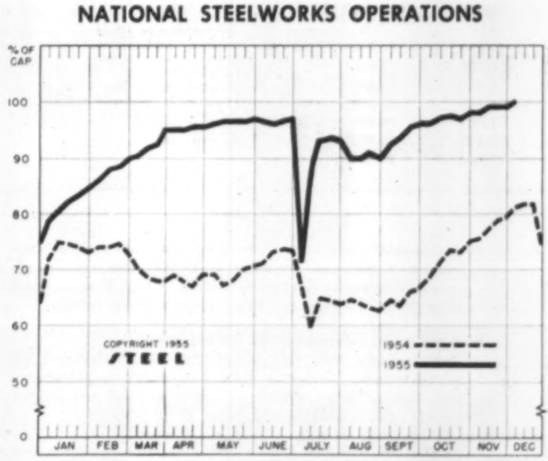
Carry-overs stem not from a lack of production by the steel industry but from a flood of demand. Nearly all of this year, steel production has been above 90 per cent of capacity. It hit a new high for this year by edging up to 100 per cent of capacity in the week ended Dec. 4. In the preceding three weeks, the rate had been 99 per cent. Although the industry operated at more than 100 per cent in previous years, it never turned out more steel than it did in the week ended Dec. 4: The industry has a larger capacity than ever before. A 100-per-cent rate now yields 2,413,278 net tons of raw steel.

GROWTH INDUSTRY— Heavy current demand for steel and projected growth of future demand continue to bring out plans for steel plant expansions. Alan Wood Steel Co., Conshohocken, Pa., announced it will boost its annual ingot capacity from 625,000 to 800,000 tons.

PRICES RISE— Costs continue to push up steel prices. Connors Steel Division of the H. K. Porter Company Inc. made an across-the-board increase of a half a cent a pound ($10 a ton) in the base price of its products. The Birmingham producer makes carbon structural shapes, hot-rolled carbon strip, carbon steel merchant bars and reinforcing bars. Lukens Steel Co., Coatesville, Pa., advanced base prices of its Monel-clad steel plate. Increases include $32 a ton on 10-per-cent Monel cladding and $64 a ton on 20 per cent. American Steel & Wire Division, U. S. Steel Corp., increased base prices on spring steel strips and revised extras on cold-rolled carbon strip. U. S. Steel Corp.'s Columbia-Geneva Steel Division and Tennessee Coal & Iron Division revised extras on sheet and strip.

BLAMES GOVERNMENT— Connors, a producer of electric furnace steel, blames its price increases on the federal government's policy of allowing heavy exports of steel scrap—a steelmaking material.

Scrap prices continued their rise and shoved STEEL's composite on steelmaking grades to $47.00 a gross ton, a 67-cent rise over the preceding week.



NATIONAL STEELWORKS OPERATIONS

DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Dec. 4	Change	Same Week 1954	Same Week 1953
Pittsburgh	102.5	— 1*	78.5	77.5
Chicago	99	+ 0.5*	91	97
Mid-Atlantic	99	+ 1	72	90
Youngstown	100	0	86	90
Wheeling	102	+ 1	90.5	91
Cleveland	96	— 2*	89.5	93
Buffalo	80	—25	100	100
Birmingham	94	0	64	96.5
New England	88	— 2	70	77
Cincinnati	92.5	0	71.5	71.5
St. Louis	101.5	— 8	83	84.5
Detroit	100.5	+ 5.5	80	101
Western	103	+ 4	84	90
National Rate	100	+ 1	81	87

INGOT PRODUCTION‡

	Week Ended Dec. 4	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	149.0†	150.4	149.4	120.8
NET TONS (In thousands)	2,394†	2,416	2,400	1,941

---

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,413,278 in 1955; 2,384,549 in 1954; 2,254,459 in 1953.

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Nov. 29 1955	Nov. 22 1955	Month Ago	Nov. Average
(1947-1949=100)	154.6	154.6	154.5	154.5

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Nov. 29

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parenthesis. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, Standard, No. 1	$4.800
Rails, Light, 40 lb	6.217
Tie Plates	5.625
Axles, Railway	8.000
Wheels, Freight Car, 33 in. (per wheel)	52.50
Plates, Carbon	4.950
Structural Shapes	4.867
Bars, Tool Steel, Carbon (lb)	0.460
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.560
Bars, Tool Steel, H.R., Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.185
Bars, Tool Steel, H.R. Alloy, High Speed W-18, Cr 4, V 1 (lb)	1.680
Bars, H.R., Alloy	9.375
Bars, H.R., Stainless, 303 (lb)	0.450
Bars, H.R., Carbon	5.350
Bars, Reinforcing	5.313
Bars, C.F., Carbon	8.660
Bars, C.F., Alloy	12.175
Bars, C.F., Stainless, 302 (lb)	0.468
Sheets, H.R. Carbon	5.145
Sheets, C.R., Carbon	6.239
Sheets, Galvanized	7.690
Sheets, C.R., Stainless, 302 (lb)	0.588
Sheets, Electrical	$10.206
Strip, C.R., Carbon	7.993
Strip, C.R., Stainless, 403 (lb)	0.444
Strip, H.R., Carbon	5.406
Pipe, Black, Buttweld (100 ft)	16.366
Pipe, Galv., Buttweld (100 ft)	19.971
Pipe, Line (100 ft)	158.925
Casing, Oil Well, Carbon (100 ft)	165.120
Casing, Oil Well, Alloy (100 ft)	244.670
Tubes, Boiler (100 ft)	39.470
Tubing, Mechanical, Carbon	20.980
Tubing, Mechanical, Stainless, 304 (100 ft)	178.897
Tin Plate, Hot-dipped, 1.25 lb	8.933
Tin Plate, Electrolytic, 0.25 lb	7.633
Black Plate, Canmaking Quality	6.733
Wire, Drawn, Carbon	8.575
Wire, Drawn, Stainless 430 (lb)	0.578
Bale ties (bundle)	6.473
Nails, Wire, 8d Common	8.618
Wire, Barbed (80-rod spool)	7.847
Woven Wire Fence (20-rod roll)	18.635

STEEL's FINISHED STEEL PRICE INDEX*

	Nov. 30 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	208.90	208.90	208.90	194.53	157.76
Index in cents per lb	5.659	5.659	5.659	5.270	4.274

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$128.14	$128.14	$128.14	$117.95	$95.09
No. 2 Fdry, Pig Iron, GT	58.99	58.99	58.99	56.54	49.54
Basic Pig Iron, GT	58.49	58.49	58.49	56.04	49.04
Malleable Pig Iron, GT	59.77	59.77	59.77	57.27	50.27
Steelmaking Scrap, GT	47.00	46.33	45.17	32.58	41.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Nov. 30 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.65	4.65	4.65	4.30	3.45
Bars, H.R., Chicago	4.65	4.65	4.65	4.30	3.45
Bars, H.R., deld. Philadelphia	4.90	4.90	4.90	4.55	3.93
Bars, C.F., Pittsburgh	5.90	5.90	5.90	5.40	4.15
Shapes Std., Pittsburgh	4.60	4.60	4.60	4.25	3.40
Shapes, Std., Chicago	4.60	4.60	4.60	4.25	3.40
Shapes, deld., Philadelphia	4.88	4.88	4.88	4.53	3.46
Plates, Pittsburgh	4.50	4.50	4.50	4.225	3.50
Plates, Chicago	4.50	4.50	4.50	4.225	3.50
Plates, Coatesville, Pa.	4.80	4.80	4.80	4.225	3.90
Plates, Sparrows Point, Md.	4.50	4.50	4.50	4.225	3.50
Plates, Claymont, Del.	4.80	4.80	4.80	4.225	3.90
Sheets, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3 35
Sheets, H.R., Chicago	4.325	4.325	4.325	4.05	3.35
Sheets, C.R., Pittsburgh	5.325	5.325	5.325	4.95	4.10
Sheets, C.R., Chicago	5.325	5.325	5.325	4.95	4.10
Sheets, C.R., Detroit	5.325-5.425	5.325-5.425	5.325-5.425	5.10	4.30
Sheets, Galv., Pittsburgh	5.85	5.85	5.85	5.45	4.40
Strip, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.50-3.75
Strip, H.R., Chicago	4.325	4.325	4.325	4.05	3.25
Strip, C.R., Pittsburgh	6.25	6.25	6.25	5.75	4.15-4.85
Strip, C.R., Chicago	6.35	6.35	6.35	5.85	4.30
Strip, C.R., Detroit	6.35	6.35	6.35	5.90	4.35-5.10
Wire, Basic, Pittsburgh	6.25	6.25	6.25	5.75	4.50-4.75
Nails, Wire, Pittsburgh	7.60	7.60	7.60	6.85	5.30 5 60
Tin plate (1.50 lb), box, Pitts.	$9.45	$9.45	$9.45	$9.05	$7.50

SEMIFINISHED STEEL

Billets, Forging, Pitts. (NT)	$84.50	$84.50	$84.50	$78.00	$63.00
Wire rods, $\frac{7}{32}$-⅝" Pitts.	5.025	5.025	5.025	4.675	3.85

PIG IRON, Gross Ton

Bessemer, Pitts.	$59.50	$59.50	$59.50	$57.00	$50.00
Basic, Valley	58.50	58.50	58.50	56.00	49 00
Basic, deld. Phila.	62.16	62.16	62.16	59.66	53.39
No. 2 Fdry, Pitts.	59 00	59.00	59 00	56.50	49.50
No. 2 Fdry, Chicago	59.00	59.00	59.00	56.50	49.50
No. 2 Fdry, Valley	59.00	59.00	59.00	56.50	49.50
No. 2 Fdry, deld. Phila.	62.66	62.66	62.66	50.16	53.89
No. 2 Fdry, Birm.	55.00	55.00	55.00	52.88	45.88
No. 2 Fdry (Birm.) deld. Cin.	62.70	62.70	62.70	60.58	52.58
Malleable, Valley	59.00	59 00	59.00	56 50	49 50
Malleable, Chicago	59.00	59.00	59.00	56.50	49.50
Ferromanganese, Duquesne	190.00†	190.00†	190.00†	190.00†	175.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (including broker's commission)

No. 1 Heavy Melt, Pitts.	$46.50	$45.50	$44.50	$32.50	$44.00
No. 1 Heavy Melt, E. Pa.	48.00	48.00	46.50	32.25	39.00
No. 1 Heavy Melt, Chicago	46.50	45.50	44.50	33.00	40.00
No. 1 Heavy Melt, Valley	52.50	48.00	48.00	34.50	43.75
No. 1 Heavy Melt, Cleve.	49.50	45.50	45.50	32.50	43.25
No. 1 Heavy Melt, Buffalo	43.50	43.50	43.50	30.50	41.50
Rails, Rerolling, Chicago	69.50	66.50	65.50	52.50	65.50
No. 1 Cast, Chicago	49.50	48.50	47.50	39.50	61.00

COKE, Net Ton

Beehive, Furn, Connlsvl.	$13.625	$13.625	$13.625	$13.75	$14.25
Beehive, Fdry, Connlsvl.	16.50	16.50	16.50	16.75	16.50
Oven, Fdry, Chicago	25.75	25.75	25.75	24.50	21.00

Daily Nonferrous Price Record

	Price Nov. 30	Last Change	Previous Price	Oct. Avg.	Sept. Avg.	Nov. 1954 Avg.
Copper	43.00-47.00	Nov. 28, 1955	43.00-46.50	44.594	45.380	30.000
Lead	**15.30**	Sept. 26, 1955	14.80	**15.300**	**14.920**	**14.800**
Zinc	**13.00**	Oct. 21, 1955	**13.00-13.50**	**13.020**	**12.940**	**11.500**
Tin	100.25	Nov. 29, 1955	99.625	96.230	96.565	91.196
Nickel	**64.50**	Nov. 24, 1954	**60.00**	**64.500**	**64.500**	**60.000**
Aluminum	**24.40**	Aug. 8, 1955	**23.20-24.40**	**24.400**	**24.400**	**22.200**
Magnesium	**32.50**	Aug. 16, 1955	**28.50**	**32.500**	**32.500**	**27.000**

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld, New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, 99.8%, Freeport, Tex.

What You Can Use the Markets Section for:

- **A source of price information.**
  Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.**
  Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.**
  Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.**
  Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**

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189

THE UNITED STATES GRAPHITE COMPANY

DIVISION OF THE WICKES CORPORATION • SAGINAW, MICHIGAN

Nonferrous Metals

Next year should see marked improvement in nickel supply as the government continues to divert from stockpile and military requirements drop

Nonferrous Metal Prices, Pages 178 & 179

IT'S ALMOST certain that the nickel shortage would be over if the government stopped stockpiling. In fact, there could be a surplus and a price reduction.

But—The government has no such intention. One thing is apparent. As more production facilities come in and stockpile objectives come closer to being realized, the government may become more lenient. This year is a case in point. Some 24 million lb have been diverted from stockpile to the military and civilian markets. Civilian relief has been slight because military requirements have jumped. But it is an initial step.

How much nickel is used for military applications is top secret, but it is estimated that about 40 per cent of all nickel produced is needed to meet world-wide military requirements.

Rundown—The estimated supply of nickel for the U. S. this year is about 300 million lb. The world supply will come in at about 400 million lb. Combined consumption by the U. S. military (including the Atomic Energy Commission) and civilian industry will reach 225 to 230 million lb. The rest goes to stockpile.

Forward Look—Revival of controls is out of question. The government will not take the responsibility, or the headaches, involved. Primary producers will continue to juggle supply, giving everyone a proportional share.

Each year is going to see progress toward equalization of supply and demand. While stockpile contracts extend through 1962, it is conceivable that by 1958 the government will be telling primary producers: "See if you can sell it. If you can't, we will take it." This could happen in small degree from now on.

What about the price of nickel? On the gray market it is bringing as much as $2.50 a pound. Japanese and French nickel, which is not finding its way into the gray market, is still expensive. But most experts are quick to point out that the current market price (about 64½-cents a pound) is in the area where this primary metal has been sold and developed through the years. This, they feel, is the best barometer for the future.

Help Coming—There is a growing feeling that the military take is too high. Reason: There may be a basic misunderstanding of regulations pertaining to the right of certification. The Business & Defense Services Administration is conducting a survey to discover what abuses, if any, are taking place. Outlook: With various government agencies keeping a closer watch, military requirements should drop during the coming year.

Meanwhile, there is some move toward finding substitutes. While this is causing primary producers concern, it is felt that nickel will be reinstated in most cases as soon as there is enough to go around.

Crux for '56: If the government continues to divert nickel and military demands are reduced, the coming year could see supply nearly catch up with demand.

Tin Faces Decisions

Demand and supply in the tin market are so close that minor situations, such as a breakdown in Nigerian wage negotiations, or temporarily low stocks in the United Kingdom, are having immediate repercussion on tin prices.

While the price hovers near 99 cents a pound, other important questions will have to be solved during the early part of next year. One big question: What is to become of the U. S. Facilities Corp.'s Texas City smelter? At this stage, it is a white elephant because it takes Congressional approval before a company can purchase it. No one is going to risk going out to find an ore supply before he knows that it is possible to own the smelter. And without an assured ore supply, no one is going to be interested in buying. There is a growing feeling that the best solution is to sell the installation and allow the purchaser to use it for any purpose.

Tin Prices Edge Up

(average price in cents per lb)

November*	97.784
October	96.230
September	96.565
August	96.519
July	97.045
June	93.668
May	91.410
April	91.458
March	91.176
February	90.908
January	87.280

*Estimated

The tin market is tight at the moment, but someone will have to solve the problem of where some 23,000 tons of tin are going to be used. It has been going into stockpile.

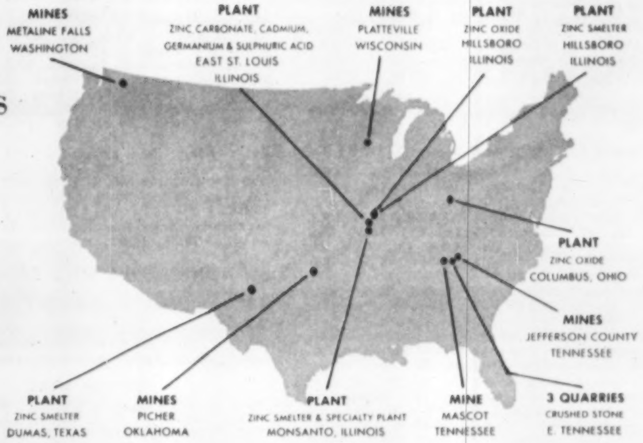
Outlook for '56: Consumption will be at high levels, but prices could edge downward rather than upward (see table) as a surplus appears.

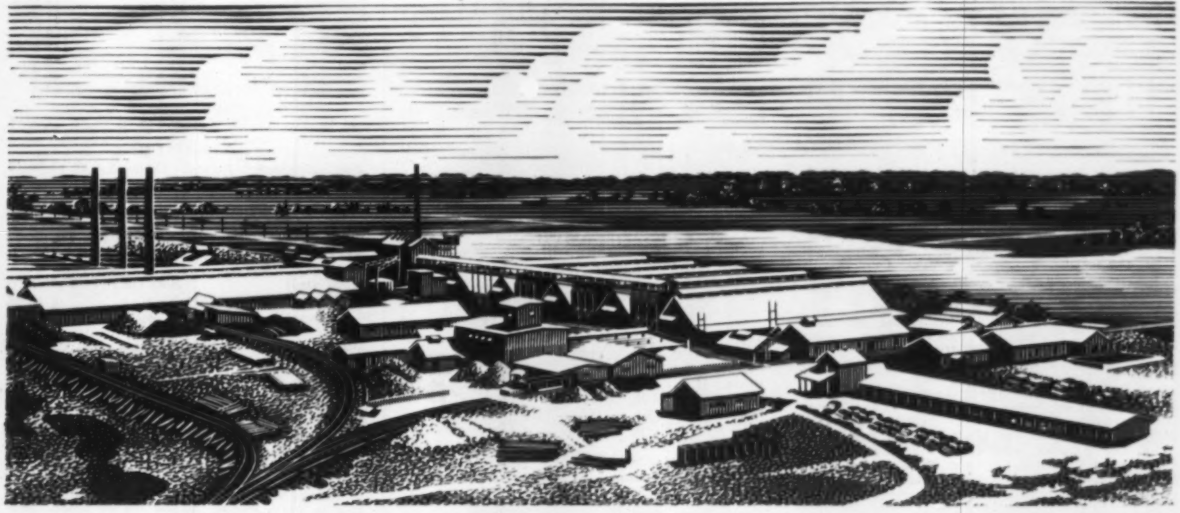
Market Memos

- In October, magnesium ingot production registered a 6-per-cent increase over September's 5923 tons, reports the Magnesium Association. Wrought products dropped from an unusual peak of 1079 tons shipped in September to 833 tons in October. Plus signs continue to dominate the totals of magnesium casting shipments. For the first nine months of the year, total shipments are up 10 per cent. Magnesium permanent mold castings for the period are up 34 per cent, diecastings, 22 per cent.
- Titanium sponge metal has been reduced 30 cents a pound, from $3.75 to $3.45. Titanium Metals Corp. of America reduced prices for all titanium mill products, too. The reductions on sheet, strip, bar, billet, wire and plate range from 60 cents to $3 a pound.
- The rumor persists that lead prices are due for another increase.
- Handy & Harman has posted a price of 91 cents a troy ounce for silver. This is a reduction of ⅝-cents from the price established on Oct. 19. It is attributed to a seasonal decline, as most silver users have passed peak season operations.
- Reynolds Metals Co. announces that the Kentucky turnpike will have highway signs fabricated from extruded aluminum. They fit together like tongue-and-groove flooring to form the sign surface. By using aluminum, signs can be made up to 30 ft wide, with no restriction on height. Minnesota Mining & Mfg. Co. received the contract for the aluminum signs; Reynolds will supply the aluminum.

American Zinc and its products

from A *to* Z


MINES
METALINE FALLS
WASHINGTON
PLANT
ZINC CARBONATE, CADMIUM,
GERMANIUM & SULPHURIC ACID
EAST ST. LOUIS
ILLINOIS
MINES
PLATTEVILLE
WISCONSIN
PLANT
ZINC OXIDE
HILLSBORO
ILLINOIS
PLANT
ZINC SMELTER
HILLSBORO
ILLINOIS
PLANT
ZINC OXIDE
COLUMBUS, OHIO
MINES
JEFFERSON COUNTY
TENNESSEE
PLANT
ZINC SMELTER
DUMAS, TEXAS
MINES
PICHER
OKLAHOMA
PLANT
ZINC SMELTER & SPECIALTY PLANT
MONSANTO, ILLINOIS
MINE
MASCOT
TENNESSEE
3 QUARRIES
CRUSHED STONE
E. TENNESSEE



FORT SMITH, ARKANSAS, PLANT OPERATES UNDER CONTRACT WITH AMERICAN ZINC

Zinc smelter, owned and operated by the Athletic Mining and Smelting Company, produces Prime Western slab zinc for American Zinc exclusively. Plant has roasting and nodulizing equipment, as well as horizontal retort furnaces. For complete picture of American Zinc's own operations, see map above.

PRODUCERS OF

ALL GRADES OF SLAB ZINC
ZINC ANODES (Plating & Galvanic)
METALLIC CADMIUM
SULPHURIC ACID
LEAD-FREE and LEADED ZINC OXIDES
ZINC CARBONATE
GERMANIUM DIOXIDE
AGRICULTURAL LIMESTONE
CRUSHED STONE

American Zinc sales Company

Distributors for AMERICAN ZINC, LEAD & SMELTING COMPANY

Columbus, Ohio • Chicago • St. Louis • New York • Detroit • Pittsburgh

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots 24.40, pigs 22.50. 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 26.20; No. 43, 5% Si, 26.00; 142, 4% Cu, 1.5% Mg, 2% Ni, 28.20; No. 195, 4.5% Cu, 0.8% Si, 27.60; No. 214, 3.8% Mg, 27.80; No. 356, 7% Si, 0.3% Mg, 26.20.

Antimony: R.M.M. brand, 99.5%, 33.00, Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.50, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa., Elmore, O.

Beryllium Copper: 3.75-4.25% Be $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb, deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 43.00 deld. Conn. Valley; 43.00 deld. Midwest; custom smelters, 46.00-46.50 deld.; Lake, 43.00 deld.; Fire refined, 42.75 deld.

Germanium: 99.9%, $295 per lb, nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $100-$120 nom, per troy oz.

Lead: Common, 15.30, chemical, 15.40, corroding, 15.40, St. Louis, New York basis, add 0.20.

Lithium: 99%+, cups, or ingot, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: 99.8%, self-palletizing pig, 32.50; notched ingot, 33.25, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40 for pig and 1.45 for ingot; for Madison, Ill., add 1.20 for pig and 1.25 for ingot; for Los Angeles, add 2.00 for both pig and ingot. Sticks 1.3 in. diameter, 53.00, 100 to 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, G, H and R, 36.00; alloy M, 38.00, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40; for Madison, Ill., add 0.50; for Los Angeles, add 2.50.

Mercury: Open market, spot, New York, $278-$285 per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced, $3-$3.25 per lb; pressed ingot, $4.06 per lb; sintered ingot, $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $80-$100, nom., per troy oz.

Palladium: $22-$24 per troy oz.

Platinum: $97-$112 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $9-$10 per lb.

Silver: Open market, 91.00 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot 100.25; prompt, 100.125.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max), $3.45, grade A-2 (0.5% Fe max), $3.15 per pound.

Tungsten: Powder, 98.8%, carbon, reduced, 1000-lb lots, $4.50 per lb, nom., f.o.b. shipping point; less than 1000 lb add 15.00; 99+% hydrogen reduced, $4.65. Treated ingots, $6.70.

Zinc: Prime Western, 13.00; brass special, 13.25; intermediate, 13.50, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.35; special high grade 14.50-14.75, deld. Diecasting alloy ingot No. 3, 17.50; No. 2, 18.50; No. 5, 18.00, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, $10 per lb. Powder electronics grade, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 31.50-33.50; No. 12 foundry alloy (No. 2 grade) 30.50-30.75; 5% silicon alloy, 0.60 Cu max, 32.00-32.75; 13 alloy, 0.60 Cu max, 32.00-32.75; 195 alloy, 32.00-32.75; 108 alloy, 30.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 31.00-32.00; grade 2, 30.00-31.00; grade 3, 29.00-30.00; grade 4, 28.00-29.00.

Brass Ingot: Red brass No. 115, 41.00; tin bronze No. 225, 54.00; No. 245, 47.25; high-leaded tin bronze No. 305, 44.75; No. 1 yellow No. 405, 32.75; manganese bronze No. 421, 36.25.

Magnesium Alloy Ingot: AZ63A, 34.00; AZ91B, 34.00; AZ91C, 34.00; AZ92A, 34.00.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.84; rod, bar, wire, $1.81.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000-lb lots, 48.35; 30,000-lb lots 48.88; l.c.l., 48.98. Weatherproof, 100,000-lb lots, 46.03; 30,000-lb lots, 46.28; l.c.l, 46.78. Magnetic wire deld., 15,000 lb or more, 55.52; l.c.l., 56.27.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $21 per cwt; pipe, full coils, $21 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $13.10-$13.60; sheared mill plate, $10.50-$12.00; strip, $13.10-$13.60; wire, $9.50-$11.50; forging billets, $7.90-$8.15; hot-rolled and forged bars, $7.90-$8.15.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 23.00; ribbon zinc in coils, 20.50; plates 19.50-22.25.

ZIRCONIUM

Plate, $22; H.R. strip, $19; C.R. strip, $29; forged or H.R. bars, $17; wire, 0.015 in., 1.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	102	83	99
Strip, C.R	102	92	125
Plate, H.R.	97	87	95
Rod, Shapes H.R. ..	87	74	93
Seamless Tubes	122	110	153
Shot, Blocks	...	71	...

ALUMINUM

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	—Round— 2011-T3	—Round— 2017-T4	—Hexagonal— 2011-T3	—Hexagonal— 2017-T4
Drawn				
0.125	67.9	66.4	...	...
0.156-0.172	57.5	55.9	...	...
0.188	57.5	55.9	...	71.7
0.219-0.234	54.5	52.9	...	...
0.250-0.281	54.5	52.9	...	68.4
0.313	54.5	52.9	...	65.2
Cold-finished				
0.375-0.547	53.4	51.4	63.7	61.3
0.563-0.688	53.4	51.4	60.6	57.5
0.750-1.000	52.1	50.1	55.4	54.2
1.063	52.1	50.1	...	52.3
1.125-1.500	50.1	48.2	53.6	52.3
Rolled				
1.563	48.8	46.9	...	...
1.625-2.000	48.2	46.2	...	50.5
2.125-2.500	47.0	45.0	...	...
2.563-3.375	45.6	43.6	...	...

ALUMINUM

Sheets and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range Inches	Flat Sheet	Flat Sheet Circles*	Coiled Sheet	Coiled Sheet Circle†
0.249-0.136	37.5	42.3	...	...
0.135-0.096	38.0	43.2	...	...
0.095-0.077	38.7	44.2	36.1	41.3
0.076-0.061	39.3	45.1	36.3	41.5
0.060-0.048	39.9	45.6	36.7	42.0
0.047-0.038	40.4	46.5	37.2	42.4
0.037-0.030	40.8	47.0	37.6	43.1
0.029-0.024	41.4	47.5	37.9	43.6
0.023-0.019	42.2	49.0	38.8	44.5
0.018-0.017	43.0	...	39.4	45.4
0.016-0.015	43.9	...	40.2	46.6
0.014	44.9	...	41.2	47.9
0.013-0.012	46.1	...	41.9	48.9
0.011	47.1	...	43.1	50.5
0.010-0.0095	48.4	...	44.3	52.2
0.009-0.0085	49.7	...	45.8	54.3
0.008-0.0075	51.3	...	47.0	56.1
0.007	52.8	...	48.5	58.4
0.006	54.4	...	49.9	63.4

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*48 in. max diam. †26 in. max diam.

ALUMINUM

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam. 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	36.5	40.8
5050-F	37.6	41.9
3004-F	38.6	43.8
5052-F	39.9	45.2
6061-T6	41.1	46.0
2024-T4*	43.6	49.9
7075-T6*	51.4	58.5

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*24-48 in. widths or diam, 72-180 in. lengths

ALUMINUM

Forging Stock: Round, Class 1, 39.10-50.10 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 43.00-56.20 in random lengths, 0.375-4 in. thick, widths 0.750-10 in.

Pipe: ASA. Schedule 40, alloy 6063-T6, 20-ft lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
¾	$16.85	2	$ 51.95
1	26.50	4	143.00
1¼	35.85	6	256.70
1½	42.90	8	386.30

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032 in., 99c; 0.064 in., 78.00c; 0.125 in., 63.50c, 30,000 lb and over, f.o.b. mill.

Plate: AZ31, 61.00c, 30,000 lb or more, 0.250 in. and over, widths 24-60 in., lengths 72-180 in.; tread plate, [illegible].00c, 30,000 lb or more, ¼-in. thick, widths 24-60 in., lengths 60-192 in.; tooling plate 66.00c, 30,000 lbs or more, .250-3.000 in., widths 60-72 in., lengths 72-180 in.

Extrusions: AZ31 commercial grade, rectangles, ¼ x 2 in., 64.70c; 1 x 4 in., 69.50c. Rod, 1 in., 61.50c; 2 in., 59.00c. Tubing, 1 in. OD x 0.065 in., 82.50c; Angles, 1 x 1 x ⅛-in., 68.40c; 2 x 2 x ¼-in., 62.50c. Channels, 5 in., 63.40c. I-beams, 5 in., 62.70c.

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 19.50-20.00; old sheets 16.50-17.25; borings and turnings, 11.00-11.50; crankcases, 16.50-17.25; industrial castings 16.50-17.25.

Copper and Brass: No. 1 heavy copper and wire 37.50-38.00; No. 2 heavy copper and wire, 36.00-36.50; light copper, 33.50-34.00; No. 1 composition red brass, 29.50-30.00; No. 1 composition turnings, 27.50-28.00; yellow

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	62.76-63.13b	60.36c	....	62.82-63.32	39.000	39.000	38.250
Yellow Brass	52.27	42.41d	52.81	55.18	28.875	28.625	26.750
Red Brass, 85%	58.09	58.03	58.63	60.90	34.250	34.000	33.500
Low Brass, 80%	56.55	56.49	57.09	59.36	32.750	32.250	31.750
Naval Brass	55.63	49.94	62.69	58.79	26.750	26.500	26.000
Com. Bronze, 90%	60.18	60.12	60.72	62.74	35.750	35.500	35.000
Nickel Silver, 10%	66.00	68.33g	68.33	....	32.500	32.250	16.250
Phos. Bronze, A, 5%	80.99	81.49	81.49	82.67	39.250	39.000	38.000
Silicon Bronze	66.54	65.73	66.58	68.68e	37.625	37.375	36.875
Manganese Bronze	59.37-59.45	53.38-53.47	63.82	....	27.000	26.750	26.000
Muntz Metal	53.74	49.55	....	....	27.000	26.750	26.250

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

brass turnings, 16.00-16.50; new brass clippings, 24.50-25.00; light brass, 16.50-17.00; heavy yellow brass, 19.50-20.00; new brass rod ends, 23.50-24.00; auto radiators, unsweated, 22.50-23.00; cocks and faucets, 24.00-24.50; brass pipe, 24.50-25.00.

Lead: Heavy, 12.00-12.50; battery plates, 6.50-6.75; linotype and stereotype, 13.25-14.25; electrotype, 12.00-12.75; mixed babbitt, 14.50.

Magnesium: Clippings, 18.50-19.50; clean castings, 18.00-19.00; iron castings, not over 10% removable Fe, less full deduction for Fe, 16.00-17.00.

Monel: Clippings, 54.50-60.00; old sheets, 45.00-50.00; turnings, 44.00; rods, 54.50-60.00.

Nickel: Sheets and clips, 90.00-125.00; rolled anodes, 90.00-125.00; turnings, 75.00-100.00; rod ends, 90.00-125.00.

Zinc: Old zinc, 5.00-6.00; new die-cast scrap, 5.00-5.75; old die-cast scrap, 3.25-3.50.

REFINER'S BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 23.00-23.50; 3003 clippings, 22.75-23.50; 6151 clippings, 22.50-23.50; 5052 clippings, 22.50-23.50; 2014 clippings, 22.50; 2017 clippings, 22.50; 2024 clippings, 22.50; mixed clippings, 22.00-22.50; old sheet, 19.50-20.00; old cast, 20.00-20.50; clean old cable (free of steel), 23.00-23.50; borings and turnings, 20.00-21.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 65.00; light scrap, 60.00; turnings and borings, 43.00-55.00.

Copper and Brass: No. 1 heavy copper and wire, 40.50; No. 2 heavy copper and wire, 39.00; light copper, 36.75; refinery brass (60% copper) per dry copper content, 37.00.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 40.50; No. 2 heavy copper and wire, 39.00; light copper, 36.75; No. 1 composition borings, 32.50-33.50; No. 1 composition solids, 33.50-34.00; heavy yellow brass solids, 22.50-23.00; yellow brass turnings, 21.50; radiators, 26.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 59.42-59.79, oval, 58.92, 5000-10.000 lb; electrodeposited, 56.78, 2000-5000 lb lots; cast 62.54, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29.999 lb, 93.50; 30.000 lb, 91.50. Carbonized, deduct 3 cents a lb. All prices eastern delivery effective Jan. 1, 1955.

Tin: Bar or slab, less than 200 lb, $1.175; 200-499 lb, $1.16; 500-999 lb, $1.155; 1000 lb or more, $1.15.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100-lb drums.

Chromic Acid: Less than 10,000 lb, 28.50; over 10,000 lb, 27.50.

Copper Cyanide: 100 lb, 85.25; 200 lb, 84.50; 300 lb, 84.25; 400-900 lb, 85.50; 1000 lb, 81.50.

Copper Sulphate: 500-1900 lb, 17.90; 2000-5900 lb, 15.90; 6000 lb or more, 15.65.

Nickel Chloride: 100 lb, 46.50; 200 lb, 44.50; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 39.50; 10,000 lb and over, 38.50. All prices eastern delivery, effective Jan. 1, 1955.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 3300 lb, 35.25; 400-4900 lb, 33.25; 5000-35.900 lb, $1.25; 36,000 lb 30.25. All prices eastern delivery, effective Jan. 1, 1955.

Silver Cyanide: (Cents per ounce) 4-oz bottle, 86.875; 16-oz bottle, 85.625; 80-oz bottle, 83.125; 100-oz bottle, 83.125; f.o.b. St. Louis, New York and Los Angeles. Effective Sept. 30, 1955.

Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20.000 lb and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb, 74.00; 100-600 lb, 59.60; 700-1900 lb, 57.10; 2000-9900 lb, 55.30; 10.000 lb or more, 54.20.

Stannous Chloride (Anhydrous): Less than 50 lb, $1.606; 50 lb, $1.266; 100-300 lb, $1.116; 400-900 lb, $1.092; 1000-1900 lb, $1.068; 2000-4900 lb, $1.031; 5000-19,900 lb, 97.00; 20,000 lb or more, 90.90.

Stannous Sulphate: Less than 50 lb, $1.304; 50 lb, $1.004; 100-1900 lb, 98.40; 2000 lb or more, 96.40.

Zinc Cyanide: Under 1000 lb, 54.30; 1000 lb and over, 52.30.

There's *this* about "Fischer Turned" BRASS AND ALUMINUM NUTS

CLASS 2 PRECISION THREADS
COUNTERSUNK BOTH SIDES
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Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key on page 181. Key to footnotes, Page 183.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5	$65.50

INGOTS, Alloy (NT)

Detroit R7	$69.00
Houston S5	74.00
Midland,Pa. C18	69.00
Munhall,Pa. U5	69.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Aliquippa,Pa. J5	$68.50
Bessemer,Pa. U5	68.50
Bridgeport,Conn. N19	73.50
Buffalo R2	68.50
Clairton,Pa. U5	68.50
Ensley,Ala. T2	68.50
Fairfield,Ala. T2	68.50
Fontana,Calif. K1	76.00
Gary, Ind. U5	68.50
Johnstown,Pa. B2	68.50
Lackawanna,N.Y. B2	68.50
LoneStar,Tex. L6	74.50
Munhall, Pa. U5	68.50
Pittburgh J5	68.50
S.Chicago,Ill. R2, U5	68.50
S.Duquesne,Pa. U5	68.50
Youngstown R2	68.50

Carbon, Forging (NT)

Aliquippa,Pa. J5	$84.50
Bessemer,Pa. U5	84.50
Bridgeport,Conn. N19	89.50
Buffalo R2	84.50
Canton,O. R2	86.50
Clairton,Pa. U5	84.50
Conshohocken,Pa. A3	89.50
Ensley,Ala. T2	84.50
Fairfield,Ala. T2	84.50
Fontana,Calif. K1	92.00
Gary,Ind. U5	84.50
Geneva,Utah C11	84.50
Houston S5	89.50
Johnstown,Pa. B2	84.50
Lackawanna,N.Y. B2	84.50
Los Angeles B3	94.00
Midland,Pa. C18	84.50
Munhall,Pa. U5	84.50
Pittsburgh J5	84.50
Seattle B3	98.00
S.Chicago R2,U5,W14	84.50
S.Duquesne,Pa. U5	84.50
S.SanFrancisco B3	94.00

Alloy, Forging (NT)

Bethlehem,Pa. B2	$96.00
Buffalo R2	96.00
Canton,O. R2, T7	96.00
Conshohocken,Pa. A3	103.00
Detroit R7	96.00
Fontana,Calif. K1	115.00
Gary,Ind. U5	96.00
Houston S5	101.00
Ind.Harbor,Ind. Y1	96.00
Johnstown,Pa. B2	96.00
Lackawanna,N.Y. B2	96.00
LosAngeles B3	116.00
Massillon,O. R2	96.00
Midland,Pa. C18	96.00
Munhall,Pa. U5	96.00
S.Chicago R2,U5,W14	96.00
S.Duquesne,Pa. U5	96.00
Struthers,O. Y1	96.00
Warren,O. C17	96.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2	$103.50
Canton,O. R2	103.50
Cleveland R2	103.50
Gary,Ind. U5	103.50
S.Chicago R2, W14	103.50
S.Duquesne,Pa. U5	103.50

SKELP

Aliquippa,Pa. J5	4.325
LoneStar,Tex. L6	4.625
Munhall,Pa. U5	4.225
SparrowsPoint,Md. B2	4.225
Warren,O. R2	4.225
Youngstown R2, U5	4.225

WIRE RODS

AlabamaCity,Ala. R2	5.025
Aliquippa,Pa. J5	5.025
Alton,Ill. L1	5.20
Buffalo B11, W12	5.025
Cleveland A7	5.025
Donora,Pa. A7	5.025
Fairfield,Ala. T2	5.025
Houston S5	5.275
IndianaHarbor,Ind. Y1	5.025
Johnstown,Pa. B2	5.025
Joliet,Ill. A7	5.025
KansasCity,Mo. S5	5.275
Kokomo,Ind. C16	5.125
LosAngeles B3	5.825
Minnequa,Colo. C10	5.275
Monessen,Pa. P7	5.025
N.Tonawanda,N.Y. B11	5.025
Pittsburg,Calif. C11	5.675
Portsmouth P12	5.025
Roebling,N.J. R5	5.125
S.Chicago,Ill. R2	5.025
SparrowsPoint,Md. B2	5.125
Sterling,Ill.(1) N15	5.025
Sterling,Ill. N15	5.125
Struthers,O. Y1	5.025
Worcester,Mass. A7	5.325

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2	4.60
Aliquippa,Pa. J5	4.60
Bessemer,Ala. T2	4.60
Bethlehem,Pa. B2	4.65
Birmingham C15	*5.10*
Clairton,Pa. U5	4.60
Fairfield,Ala. T2	4.60
Fontana,Calif. K1	5.25
Gary,Ind. U5	4.60
Geneva,Utah C11	4.60
Houston S5	4.70
Ind.Harbor,Ind. I-2	4.60
Johnstown,Pa. B2	4.65
KansasCity,Mo. S5	4.70
Lackawanna,N.Y. B2	4.65
LosAngeles B3	5.30
Minnequa,Colo. C10	4.90
Munhall,Pa. U5	4.60
Niles,Calif. P1	4.90
Portland,Oreg. O4	5.35
Phoenixville,Pa. P4	5.15
Seattle B3	5.35
S.Chicago U5, W14	4.60
S.SanFrancisco B3	5.25
Torrance,Calif. C11	5.30
Weirton,W.Va. W6	4.60

Wide Flange

Bethlehem,Pa. B2	4.65
Clairton,Pa. U5	4.60
Fontana,Calif. K1	5.40
Lackawanna,N.Y. B2	4.65
Munhall,Pa. U5	4.60
Phoenixville,Pa. P4	5.15
S.Chicago,Ill. U5	4.60

Alloy Std. Shapes

Clairton,Pa. U5	5.65
Fontana,Calif. K1	7.30
Gary,Ind. U5	5.65
Houston S5	5.75
Munhall,Pa. U5	5.65
S.Chicago,Ill. U5	5.65

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5	6.75
Bessemer,Ala. T2	6.75
Bethlehem,Pa. B2	6.80
Clairton,Pa. U5	6.75
Fairfield,Ala. T2	6.75
Fontana,Calif. K1	7.40
Gary,Ind. U5	6.75
Geneva,Utah C11	6.75
Houston S5	6.85
Ind.Harbor,Ind. I-2, Y1	6.75
Johnstown,Pa. B2	6.80
KansasCity,Mo. S5	6.85
Lackawanna,N.Y. B2	6.80
LosAngeles B3	7.45
Munhall,Pa. U5	6.75
Seattle B3	7.50
S.Chicago,Ill. U5, W14	6.75
S.SanFrancisco B3	7.40
Struthers,O. Y1	6.75

H.S., L.A. Wide Flange

Bethlehem,Pa. B2	6.80
Lackawanna,N.Y. B2	6.80
Munhall,Pa. U5	6.75
S.Chicago,Ill. U5	6.75

PILING

BEARING PILES

Bethlehem,Pa. B2	4.65
Lackawanna,N.Y. B2	4.65
Munhall,Pa. U5	4.60
S.Chicago,Ill. U5	4.60

STEEL SHEET PILING

Ind.Harbor,Ind. I-2	5.45
Lackawanna,N.Y. B2	5.45
Munhall,Pa. U5	5.45
S.Chicago,Ill. U5	5.45

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2	4.50
Aliquippa,Pa. J5	4.50
Ashland,Ky.(15) A10	4.50
Bessemer,Ala. T2	4.50
Bridgeport,Conn. N19	4.75
Buffalo R2	4.50
Clairton,Pa. U5	4.50
Claymont,Del. C22	4.80
Cleveland J5, R2	4.60
Coatesville,Pa. L7	4.80
Conshohocken,Pa. A3	4.50
Detroit M1	4.60
Ecorse,Mich. G5	4.60
Fairfield,Ala. T2	4.50
Fontana,Calif.(30) K1	5.15
Gary,Ind. U5	4.50
Geneva,Utah C11	4.50
GaniteCity,Ill. G4	4.70
Harrisburg,Pa. P4	5.10
Houston S5	4.60
Ind.Harbor,Ind. I-2, Y1	4.50
Johnstown,Pa. B2	4.50
Lackawanna,N.Y. B2	4.50
LoneStar,Tex. L6	4.85
Mansfield,O. E6	4.50
Minnequa,Colo. C10	5.35
Munhall,Pa. U5	4.50
Newport,Ky. N9	4.50
Pittsburgh J5	4.50
Riverdale,Ill. A1	4.50
Seattle B3	5.40
Sharon,Pa. S3	4.50
S.Chicago R2, U5, W14	4.50
SparrowsPoint,Md. B2	4.50
Steubenville,O. W10	4.50
Warren,O. R2	4.50
Weirton,W.Va. W6	4.50
Youngstown R2, U5, Y1	4.50

PLATES, Carbon Abras. Resist.

Claymont,Del. C22	5.65
Fontana,Calif. K1	6.30
Geneva,Utah C11	5.65
Johnstown,Pa. B2	5.65
SparrowsPoint,Md. B2	5.65

PLATES, Wrought Iron

Economy,Pa. B14	10.40

PLATES,High-Strength Low-Alloy

Aliquippa,Pa. J5	6.725
Bessemer,Ala. T2	6.725
Clairton,Pa. U5	6.725
Cleveland J5, R2	6.725
Claymont,Del. C22	6.725
Coatesville,Pa. L7	6.725
Conshohocken,Pa. A3	6.725
Ecorse,Mich. G5	6.825
Fairfield,Ala. T2	6.725
Fontana,Calif.(30) K1	7.375
Gary,Ind. U5	6.725
Geneva,Utah C11	6.725
Houston S5	6.825
Ind.Harbor,Ind. I-2, Y1	6.725
Johnstown,Pa. B2	6.725
LosAngeles B3	7.625
Munhall,Pa. U5	6.725
Pittsburgh J5	6.725
Seattle B3	7.625
Sharon,Pa. S3	6.725
S.Chicago,Ill. U5, W14	6.725
SparrowsPoint,Md. B2	6.725
Youngstown U5, Y1	6.725

PLATES, Alloy

Bridgeport,Conn. N19	6.55
Claymont,Del. C22	6.30
Coatesville,Pa. L7	6.30
Fontana,Calif. K1	6.95
Gary,Ind. U5	6.30
Houston S5	6.40
Ind.Harbor,Ind. Y1	6.30
Johnstown,Pa. B2	6.30
Munhall,Pa. U5	6.30
Newport,Ky. N9	6.30
Seattle B3	7.20
Sharon,Pa. S3	6.30
S.Chicago,Ill. U5, W14	6.30
SparrowsPoint,Md. B2	6.30
Youngstown Y1	6.30

FLOOR PLATES

Cleveland J5	5.575
Conshohocken,Pa. A3	5.575
Harrisburg,Pa. P4	5.575
Ind.Harbor,Ind. I-2	5.575
Munhall,Pa. U5	5.575
S.Chicago,Ill. U5	5.575

PLATES, Ingot Iron

Ashland c.l. (15) A10	4.75
Ashland l.c.l. (15) A10	5.25
Cleveland c.l. R2	5.10
Warren,O. c.l. R2	5.10

BARS

BARS, Hot-Rolled Carbon

Ala.City,Ala. R2	4.65
Aliquippa,Pa. J5	4.65
Alton,Ill. L1	4.85
Atlanta A11	4.85
Bessemer,Ala. T2	4.65
Birmingham C15	*5.15*
Bridgeport,Conn. N19	4.80
Buffalo R2	4.65
Canton,O. R2	4.75
Clairton,Pa. U5	4.65
Cleveland R2	4.65
Ecorse,Mich. G5	4.75
Emeryville,Calif. J7	5.40
Fairfield,Ala. T2	4.65
FairlessHills,Pa. U5	4.80
Fontana,Calif. K1	5.35
Gary,Ind. U5	4.65
Houston S5	4.90
Ind.Harbor,Ind. I-2, Y1	4.65
Johnstown,Pa. B2	4.65
Joliet,Ill. P22	4.65
KansasCity,Mo. S5	4.90
Lackawanna,N.Y. B2	4.65
LosAngeles B3	5.35
Massillon,O. R2	4.75
Midland,Pa. C18	4.65
Milton,Pa. M18	4.65
Minnequa,Colo. C10	5.10
Niles,Calif. P1	5.00
N.Tonawanda,N.Y. B11	4.65
Pittsburg,Calif. C11	5.35
Pittsburgh J5	4.65
Portland,Oreg. O4	5.40
Seattle B3, N14	5.40
S.Chicago R2, U5, W14	4.65
S.Duquesne,Pa. U5	4.65
S.SanFran.,Calif. B3	5.40
Sterling,Ill.(1) N15	4.65
Sterling,Ill. N15	4.75
Struthers,O. Y1	4.65
Torrance,Calif. C11	5.35
Warren,O. R2	4.65
Weirton,W.Va. W6	4.65
Youngstown R2, U5	4.65

BARS, H.R. Leaded Alloy

Warren,O. C17	6.325

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2	5.575
Bridgeport,Conn. N19	5.725
Buffalo R2	5.575
Canton,O. R2, T7	5.575
Clairton,Pa. U5	5.575
Detroit R7	5.575
Ecorse,Mich. G5	5.675
Fontana,Calif. K1	6.625
FairlessHills,Pa. U5	5.725
Gary,Ind. U5	5.575
Houston S5	5.825
Ind.Harbor,Ind. I-2,Y1	5.575
Johnstown,Pa. B2	5.575
KansasCity,Mo. S5	5.825
Lackawanna,N.Y. B2	5.575
LosAngeles B3	6.625
Massillon,O. R2	5.575
Midland,Pa. C18	5.575
S.Chicago, R2, U5, W14	5.575
S.Duquesne,Pa. U5	5.575
Struthers,O. Y1	5.575
Warren,O. C17	5.575
Youngstown U5	5.575

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5	6.80
Bessemer,Ala. T2	6.80
Bethlehem,Pa. B2	6.80
Clairton,Pa. U5	6.80
Cleveland R2	6.80
Ecorse,Mich. G5	6.90
Fairfield,Ala. T2	6.80
Fontana,Calif. K1	7.50
Gary,Ind. U5	6.80
Houston S5	7.05
Ind.Harb.,Ind. I-2, Y1	6.80
Johnstown,Pa. B2	6.80
KansasCity,Mo. S5	7.05
Lackawanna,N.Y. B2	6.80
LosAngeles B3	7.50
Pittsburgh J5	6.80
Seattle B3	7.55
S.Chicago W14	6.80
S.Duquesne,Pa. U5	6.80
S.SanFrancisco B3	7.55
Struthers,O. Y1	6.80
Warren,O. R2	6.80
Youngstown U5	6.80

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa. B2	4.80

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5	4.65
Atlanta A11	4.85
Fontana,Calif. K1	5.35
Niles,Calif. P1	5.00
Pittsburgh J5	4.30
Portland,Oreg. O4	5.05
SanFrancisco S7	5.05

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5	5.65
Gary,Ind. U5	5.65
Houston S5	5.90
KansasCity,Mo. S5	5.90
Youngstown U5	5.65

BARS, C.F. Leaded Alloy

Ambridge,Pa. W18	8.325
Camden,N.J. P13	8.50
Chicago W18	8.325
Cleveland C20	8.325
Monaca,Pa. S17	8.325
Newark,N.J. W18	8.50
SpringCity,Pa. K3	8.50
Warren,O. C17	8.325

BARS, Cold-Finished Carbon

Ambridge,Pa. W18	5.90
BeaverFalls,Pa. M12, R2	5.90
Buffalo B5	5.95
Camden,N.J. P13	6.35
Carnegie,Pa. C12	5.90
Chicago W18	5.90
Cleveland A7, C20	5.90
Detroit R7	5.90
Detroit B5, P17	6.10
Donora,Pa. A7	5.90
Elyria,O. W18	5.90
FranklinPark,Ill. N5	5.90
Gary,Ind. R2	5.90
GreenBay,Wis. F7	5.90
Hammond,Ind. L2, M13	5.90
Hartford,Conn. R2	6.40
Harvey,Ill. B5	5.90
LosAngeles R2, S30	7.35
Mansfield,Mass. B5	6.45
Massillon,O. R2, R8	5.90
Midland,Pa. C18	5.90
Monaca,Pa. S17	5.90
Newark,N.J. W18	6.35
NewCastle,Pa.(17) B4	5.90
Pittsburgh J5	5.90
Plymouth,Mich. P5	6.15
Putnam,Conn. W18	6.45
Readville,Mass. C14	6.45
S.Chicago,Ill. W14	5.90
SpringCity,Pa. K3	6.35
Struthers,O. Y1	5.90
Waukegan,Ill. A7	5.90
Worcester,Mass. W19	6.35
Youngstown F3, Y1	5.90

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md. C19	5.15

BARS, Cold-Finished Alloy

Ambridge,Pa. W18	7.425
BeaverFalls,Pa.M12,R2	7.425
Bethlehem,Pa. B2	7.425
Buffalo B5	7.425
Camden,N.J. P13	7.60
Canton,O. T7	7.425
Carnegie,Pa. C12	7.425
Chicago W18	7.425
Cleveland A7, C20	7.425
Detroit R7	7.425
Detroit B5, P17	7.625
Donora,Pa. A7	7.425
Elyria,O. W8	7.425
Gary,Ind. R2	7.425
GreenBay,Wis. F7	7.425
Hammond,Ind. L2, M13	7.425
Hartford,Conn. R2	7.725
Harvey,Ill. B5	7.425
Lackawanna,N.Y. B2	7.425
LosAngeles S30	9.10
Mansfield,Mass. B5	7.725
Massillon,O. R2, R8	7.425
Midland,Pa. C18	7.425
Monaca,Pa. S17	7.425
Newark,N.J. W18	7.60
Plymouth,Mich. P5	7.625
S.Chicago W14	7.425
SpringCity,Pa. K3	7.60
Struthers,O. Y1	7.425
Warren,O. C17	7.425
Waukegan,Ill. A7	7.425
Worcester,Mass. A7	7.725
Youngstown F3, Y1	7.425

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2	4.65
Altanta A11	4.85
Birmingham C15	*5.15*
Buffalo R2	4.65
Cleveland R2	4.65
Ecorse,Mich. G5	4.75
Emeryville,Calif. J7	5.40
Fairfield,Ala. T2	4.65
FairlessHills,Pa. U5	4.80
Fontana,Calif. K1	5.35
Ft.Worth,Tex.(42) T4	5.10
Gary,Ind. U5	4.65
Houston S5	4.90

Ind.Harbor,Ind. I-2, Y1	4.65
Johnstown,Pa. B2	4.65
Joliet,Ill. P22	4.65
KansasCity,Mo. S5	4.90
Lackawanna,N.Y. B2	4.65
LosAngeles B3	5.35
Milton,Pa. M18	4.65
Minnequa,Colo. C10	5.10
Niles,Calif. P1	5.00
Pittsburg,Calif. C11	5.35
Pittsburgh J5	4.65
Portland,Oreg. O4	5.40
SandSprings,Okla, S5	5.15
Seattle B3, N14	5.40
S.Chicago R2	4.65
S.Duquesne,Pa. U5	4.65
S.SanFrancisco B3	5.40
SparrowsPoint,Md. B2	4.65
Sterling,Ill.(1) N15	4.65
Sterling,Ill. N15	4.75
Struthers,O. Y1	4.65
Torrance,Calif. C11	5.35
Youngstown R2, U5, Y1	4.65

BARS, Reinforcing (Fabricated; to Consumers)

Johnstown,Pa. ¼-1" B2	6.15
KansasCity,Kans. S5	6.45
Lackawanna,N.Y. B2	6.17
Marion,O. P11	5.90
Pittsburgh U8	6.17
Seattle B3, N14	6.60
SparrowsPt. ½-1" B2	6.15
Williamsport, Pa. S19	6.00

RAIL STEEL BARS

Avis,Pa.(3) J8	4.50
ChicagoHts.(3) C2, I-2	4.65
ChicagoHts.(4) C2, I-2	4.65
Ft.Worth,Tex.(26) T4	5.10
Franklin,Pa. (3) F5	4.65
Franklin,Pa.(4) F5	4.65
Marion,O.(3) P11	4.50
Moline,Ill.(3) R2	4.65
Tonawanda(3) B12	4.50
Tonawanda(4) B12	4.65
Williamsport,Pa.(3) S19	4.65

BARS, Wrought Iron

Economy,Pa.(S.R.)B14	11.50
Economy,Pa(D.R.)B14	14.30
Economy(Staybolt)B14	14.65
McK.Rks. (S.R.) L5	11.50
McK.Rks. (D.R.) L5	16.00
McK.Rks.(Staybolt) L5	17.00

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2	4.325
Allenport,Pa. P7	4.325
Ashland,Ky.(8) A10	4.325
Cleveland J5, R2	4.325
Conshohocken,Pa. A3	4.375
Detroit(8) M1	4.425
Dravosburg,Pa. U5	4.325
Ecorse,Mich. G5	4.425
Fairfield,Ala. T2	4.325
FairlessHills,Pa. U5	4.375
Fontana,Calif. K1	5.075
Gary,Ind. U5	4.325
Geneva,Utah C11	4.425
GraniteCity,Ill. G4	4.525
Ind.Harbor,Ind. I-2, Y1	4.325
Kokomo,Ind. C16	4.425
Lackawanna,N.Y. B2	4.325
Mansfield,O. E6, (37)	4.325
Munhall,Pa. U5	4.325
Newport,Ky.(8) N9	4.325
Niles,O. N12	4.325
Pittsburg,Calif. C11	5.025
Pittsburgh J5	4.325
Portsmouth,O. P12	4.325
Riverdale,Ill. A1	4.325
Sharon,Pa. S3	4.325
S.Chicago,Ill. W14	4.325
SparrowsPoint,Md. B2	4.325
Steubenville,O. W10	4.325
Warren,O. R2	4.325
Weirton,W.Va. W6	4.325
Youngstown U5, Y1	4.325

SHEETS, H.R. (19 Ga. & Lighter)

Ala.City,Ala. R2	5.625
Kokomo,Ind. C16	5.475
Niles,O. N12	5.325

SHEETS, H.R. Alloy

Ind.Harbor,Ind. Y1	7.20
Youngstown Y1	7.20

SHEETS, H.R.(14 Ga. & Heavier) High-Strength Low-Alloy

Cleveland J5, R2	6.375
Conshohocken,Pa. A3	6.425
Dravosburg,Pa. U5	6.375
Ecorse,Mich. G5	6.475
Fairfield,Ala. T2	6.375
FairlessHills,Pa. U5	6.425
Fontana,Calif. K1	7.125
Gary,Ind. U5	6.375
Ind.Harbor,Ind. I-2, Y1	6.375
Lackawanna(35) B2	6.375
Munhall,Pa. U5	6.375
Pittsburgh J5	6.375
Sharon,Pa. S3	6.375
S.Chicago,Ill. U5	6.375
SparrowsPoint(36) B2	6.375
Warren,O. R2	6.375
Weirton,W.Va. W6	6.375
Youngstown U5, Y1	6.375

SHEET, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10	4.575
Ind.Harbor,Ind. I-2	4.575

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7	5.325
Cleveland J5, R2	5.325
Conshohocken,Pa. A3	5.375
Dravosburg,Pa. U5	5.325
Detroit M1	5.325
Ecorse,Mich. G5	5.425
Fairfield,Ala. T2	5.325
FairlessHills,Pa. U5	5.375
Follansbee,W.Va. F4	5.325
Fontana,Calif. K1	6.425
Gary,Ind. U5	5.325
GraniteCity, Ill. G4	5.525
Ind.Harbor,Ind. I-2, Y1	5.325
Lackawanna,N.Y. B2	5.325
Mansfield,O. E6	5.325
Middletown,O. A10	5.325
Newport,Ky. N9	5.325
Pittsburg,Calf. C11	6.275
Pittsburgh J5	5.325
Portsmouth,O. P12	5.325
SparrowsPoint,Md. B2	5.325
Steubenville,O. W10	5.325
Warren,O. R2	5.325
Weirton,W.Va. W6	5.325
Youngstown Y1	5.325

SHEETS, Cold-Rolled High-Strength Low-Alloy

Cleveland J5, R2	7.875
Dravosburg,Pa. U5	7.875
Ecorse,Mich. G5	7.975
FairlessHills,Pa. U5	7.925
Fontana,Calif. K1	8.975
Gary,Ind. U5	7.875
IndianaHarbor,Ind. Y1	7.875
Lackawanna(37) B2	7.875
Pittsburgh J5	7.875
SparrowsPoint(38) B2	7.875
Warren,O. R2	7.875
Weirton,W.Va. W6	7.875
Youngstown Y1	7.875

SHEETS, Cold-Rolled Ingot Iron

Middletown,O. A10	5.825

SHEETS, Culvert (16 Gage)	Cu Alloy	Cu Fe
Ashland,Ky. A10	6.90	...
Canton,O.R2	6.10	6.55
Dravosburg U5	6.10	...
Fairfield T2	6.10	...
Gary,Ind. U5	6.10	6.35
Ind.Harbor I-2	6.10	6.35
Kokomo,Ind. C16	6.20	...
MartinsFry. W10	6.10	...
Newport,Ky. N9	6.10	6.35
Pitts.,Calif. C11	6.85	...
SparrowsPt. B2	6.10	...

SHEETS, Culvert—Pure Iron

Ashland,Ky. A10	7.15
Gary,Ind. U5	6.35
MartinsFry.,O. W10	6.35

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2	5.85‡
Ashland,Ky. A10	5.85†
Canton,O. R2	5.85‡
Delphos,O. N16	6.60‡
Dover,O. R1	5.85‡
Dravosburg,Pa. U5	5.85†
Fairfield,Ala. T2	5.85†
Gary,Ind. U5	5.85*
GraniteCity,Ill. G4	6.05
Ind.Harbor,Ind. I-2	5.85†
Kokomo,Ind. C16	5.95‡
MartinsFerry,O. W10	5.85*
Middletown,O. A10	5.85†
Newport,Ky. N9	5.85‡
Niles,O. N12	6.85‡
Pittsburg,Calif. C1	6.60*
SparrowsPt.,Md. B2	5.85†
Steubenville,O. W10	5.85‡
Warren,O. R2	5.85†
Weirton,W.Va. W6	5.85*

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*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1	6.575

SHEETS, Galvanized High-Strength Low-Alloy

Dravosburg,Pa. U5	8.60
SparrowsPoint(39) B2	8.60

SHEETS, Galvannealed Steel

Canton,O. R2	6.25
Dravosburg,Pa. U5	6.25
Kokomo,Ind. C16	6.60
Newport,Ky. N9	6.25
Niles,O. N12	7.25

SHEETS, Galvanized Ingot Iron (Hot-dipped Continuous)

Ashland,Ky. A10	6.10
Middletown,O. A10	6.10

SHEETS, Electrogalvanized

Cleveland(28) R2	6.70
Niles,O.(28) R2	6.70
Weirton,W.Va. W6	6.55

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1)	8.50
Butler,Pa. A10 (type 2)	8.60

SHEETS, Enameling Iron

Ashland,Ky. A10	5.90
Cleveland R2	5.90
Dravosburg,Pa. U5	5.90
Gary,Ind. U5	5.90
GraniteCity,Ill. G4	6.10
Ind.Harbor,Ind. I-2	5.90
Middletown,O. A10	5.90
Niles,O. N12	5.90
Youngstown Y1	5.90

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4	7.75
Ind.Harbor,Ind. I-2	7.75
Yorkville,O. W10	7.75

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10	6.25
Gary,Ind. U5	6.25
Mansfield,O. E6	6.25
Middletown,O. A10	6.25
Niles,O. N12	6.25
Weirton,W.Va. W6	6.25

SHEETS, Long Terne, Ingot Iron

Middletown, O. A10	6.65

Key to Producers

A1	Acme Steel Co.
A3	Alan Wood Steel Co.
A4	Allegheny Ludlum Steel
A5	Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6	American Shim Steel Co.
A7	American Steel & Wire Div., U. S. Steel Corp.
A8	Anchor Drawn Steel Co.
A9	Angell Nail & Chaplet
A10	Armco Steel Corp.
A11	Atlantic Steel Co.
B1	Babcock & Wilcox Co.
B2	Bethlehem Steel Co.
B3	Beth. Pac. Coast Steel
B4	Blair Strip Steel Co.
B5	Bliss & Laughlin Inc.
B8	Braeburn Alloy Steel
B9	Brainard Steel Div., Sharon Steel Corp.
B10	E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11	Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12	Buffalo Steel Division H. K. Porter Co. Inc.
B14	A. M. Byers Co.
B15	J. Bishop & Co.
C1	Calstrip Steel Corp.
C2	Calumet Steel Div. Borg-Warner Corp.
C4	Carpenter Steel Co.
C7	Cleve. Cold Rolling Mills
C8	Cold Metal Products Co.
C9	Colonial Steel Co.
C10	Colorado Fuel & Iron
C11	Columbia-Geneva Steel
C12	Columbia Steel & Shaft.
C13	Columbia Tool Steel Co.
C14	Compressed Steel Shaft.
C15	Connors Steel Div. H. K. Porter Co. Inc.
C16	Continental Steel Corp.
C17	Copperweld Steel Co.
C18	Crucible Steel Co.
C19	Cumberland Steel Co.
C20	Cuyahoga Steel & Wire
C22	Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23	Charter Wire Inc.
C24	G. O. Carlson Inc.
D2	Detroit Steel Corp.
D3	Detroit Tube & Steel Div., Sharon Steel Corp.
D4	Disston & Sons, Henry
D6	Driver-Harris Co.
D7	Dickson Weatherproof Nail Co.
D8	Damascus Tube Co.
D9	Wilbur B. Driver Co.
E1	Eastern Gas&Fuel Assoc.
E2	Eastern Stainless Steel
E4	Electro Metallurgical Co.
E5	Elliott Bros. Steel Co.
E6	Empire Steel Corp.
F2	Firth Sterling Inc.
F3	Fitzsimmons Steel Co.
F4	Follansbee Steel Corp.
F5	Franklin Steel Div. Borg-Warner Corp.
F6	Fretz-Moon Tube Co.
F7	Ft. Howard Steel & Wire
F8	Ft. Wayne Metals Inc.
G2	Globe Iron Co.
G4	Granite City Steel Co.
G5	Great Lakes Steel Corp.
G6	Greer Steel Co.
H1	Hanna Furnace Corp.
H7	Helical Tube Co.
I-1	Igoe Bros. Inc.
I-2	Inland Steel Co.
I-3	Interlake Iron Corp.
I-4	Ingersoll Steel Div., Borg-Warner Corp.
I-6	Ivins, E., Steel Tube
I-7	Indiana Steel & Wire Co.
J1	Jackson Iron & Steel Co.
J3	Jessop Steel Co.
J4	Johnson Steel & Wire Co.
J5	Jones & Laughlin Steel
J6	Joslyn Mfg. & Supply
J7	Judson Steel Corp.
J8	Jersey Shore Steel Co.
K1	Kaiser Steel Corp.
K2	Keokuk Electro-Metals
K3	Keystone Drawn Steel
K4	Keystone Steel & Wire
K7	Kenmore Metals Corp.
L1	Laclede Steel Co.
L2	LaSalle Steel Co.
L3	Latrobe Steel Co.
L5	Lockhart Iron & Steel
L6	Lone Star Steel Co.
L7	Lukens Steel Co.
M1	McLouth Steel Corp.
M4	Mahoning Valley Steel
M6	Mercer Pipe Div., Sawhill Tubular Products
M8	Mid-States Steel & Wire
M12	Moltrup Steel Products
M13	Monarch Steel Div., Jones & Laughlin Steel Corp.
M14	McInnes Steel Co.
M16	Md. Fine & Special. Wire
M17	Metal Forming Corp.
M18	Milton Steel Prod. Div., Merritt-Chapman&Scott
N1	National-Standard Co.
N2	National Supply Co.
N3	National Tube Div., U. S. Steel Corp.
N5	Nelsen Steel & Wire Co.
N6	NewEng.HighCarb.Wire
N8	Newman-Crosby Steel
N9	Newport Steel Corp.
N12	Niles Rolling Mill Div. Sharon Steel Corp.
N14	Northwest.SteelRoll.Mills
N15	Northwestern S.&W. Co.
N16	New Delphos Mfg. Co.
N19	Northeastern Steel Corp.
O3	Oliver Iron & Steel Corp.
O4	Oregon Steel Mills
P1	Pacific States Steel Corp.
P2	Pacific Tube Co.
P4	Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5	Pilgrim Drawn Steel
P6	Pittsburgh Coke & Chem.
P7	Pittsburgh Steel Co.
P11	Pollak Steel Co.
P12	Portsmouth Division Detroit Steel Corp.
P13	Precision Drawn Steel
P14	Pitts. Screw & Bolt Co.
P15	Pittsburgh Metallurgical
P16	Page Steel & Wire Div., Amer. Chain & Cable
P17	Plymouth Steel Co.
P19	Pitts. Rolling Mills
P20	Prod. Steel Strip Corp.
P22	Phoenix Mfg. Co.
R1	Reeves Steel & Mfg. Co.
R2	Republic Steel Corp.
R3	Rhode Island Steel Corp.
R5	Roebling's Sons, John A.
R6	Rome Strip Steel Co.
R7	Rotary Electric Steel Co.
R8	RelianceDiv.,EatonMfg.
R9	Rome Mfg. Co.
R10	Rodney Metals Inc.
S1	Seneca Wire & Mfg. Co.
S3	Sharon Steel Corp.
S4	Sharon Tube Co.
S5	Sheffield Steel Div., Armco Steel Corp
S6	Shenango Furnace Co.
S7	Simmons Co.
S8	Simonds Saw & Steel Co.
S12	Spencer Wire Corp.
S13	Standard Forgings Corp.
S14	Standard Tube Co.
S15	Stanley Works
S17	Superior Drawn Steel Co.
S18	Superior Steel Corp.
S19	Sweet's Steel Co.
S20	Southern States Steel
S23	Superior Tube Co.
S25	Stainless Welded Prod.
S26	Specialty Wire Co. Inc.
S30	Sierra Drawn Steel Corp.
S40	Seneca Steel Service
T2	Tenn. Coal & Iron Div. U. S. Steel Corp.
T3	Tenn. Prod. & Chem.
T4	Texas Steel Co.
T5	Thomas Strip Division, Pittsburgh Steel Co.
T6	Thompson Wire Co.
T7	Timken Roller Bearing
T9	Tonawanda Iron Div. Am. Rad. & Stan. San.
T13	Tube Methods Inc.
U4	Universal-Cyclops Steel
U5	United States Steel Corp.
U6	U. S. Pipe & Foundry
U7	Ulbrich Stainless Steels
U8	U. S. Steel Supply Div. U. S. Steel Corp.
V2	Vanadium-Alloys Steel
V3	Vulcan Crucible Division, H. K. Porter Co. Inc.
W1	Wallace Barnes Co.
W2	Wallingford Steel Co.
W3	Washburn Wire Co.
W4	Washington Steel Corp.
W6	Weirton Steel Co.
W7	W. Va. Steel & Mfg. Co.
W8	Western Automatic Machine Screw Co.
W9	Wheatland Tube Co.
W10	Wheeling Steel Corp.
W12	Whickwire Spencer Steel Div., Colo. Fuel & Iron
W13	Wilson Steel & Wire Co.
W14	Wisconsin Steel Div., International Harvester
W15	Woodward Iron Co.
W18	Wyckoff Steel Co.
W19	Worcester Pressed Steel
Y1	Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.325
Allenport,Pa. P7	4.325
Alton,Ill. L1	4.50
Ashland,Ky.(8) A10	4.325
Atlanta A11	4.525
Bessemer,Ala. T2	4.325
Birmingham C15	*4.825*
Bridgeport,Conn. N19	4.625
Buffalo(27) R2	4.325
Conshohocken,Pa. A3	4.375
Detroit M1	4.425
Ecorse,Mich. G5	4.425
Fairfield,Ala. T2	4.325
Fontana,Calif. K1	5.075
Gary,Ind. U5	4.325
Ind.Harbor,Ind. I-2, Y1	4.325
Johnstown,Pa.(25) B2	4.325
Lackaw'na,N.Y.(24) B2	4.325
LosAngeles(25) B3	5.075
Milton,Pa. M18	4.325
Minnequa,Colo. C10	5.425
NewBritain(10) S15	4.325
N.Tonawanda,N.Y. B11	4.325
Pittsburg,Calif. C11	5.075
Portsmouth,O. P12	4.325
Riverdale,Ill. A1	4.325
SanFrancisco S7	5.05
Seattle(25) B3	5.325
Seattle N14	5.40
Sharon,Pa. S3	4.325
S.Chicago,Ill. W14	4.325
S.SanFrancisco(25) B3	5.075
SparrowsPoint,Md. B2	4.325
Sterling(1) N15	4.325
Sterling,Ill. N15	4.425
Torrance,Calif. C11	5.075
Warren,O. R2	4.325
Weirton,W.Va. W6	4.325
Youngstown U5	4.325

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19	7.50
Carnegie,Pa. S18	7.20
Fontana,Calif. K1	8.85
Gary,Ind. U5	7.20
Ind.Harbor,Ind. Y1	7.20
LosAngeles B3	8.40
Newport,Ky. N9	7.20
Sharon,Pa. S3	7.20
S.Chicago W14	7.20
Youngstown U5, Y1	7.20

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2	6.425
Conshohocken,Pa. A3	6.425
Ecorse,Mich. G5	6.525
Fairfield,Ala. T2	6.425
Fontana,Calif. K1	7.525
Gary,Ind. U5	6.425
Houston S5	6.675
Ind.Harbor,Ind. I-2, Y1	6.425
KansasCity,Mo. S5	6.675
Lackawanna,N.Y. B2	6.425
LosAngeles(25) B3	7.175
Seattle(25) B3	7.425
Sharon,Pa. S3	6.425
S.SanFrancisco(25) B3	7.175
SparrowsPoint,Md. B2	6.425
Warren,O. R2	6.425
Weirton,W.Va. W6	6.425
Youngstown U5, Y1	6.425

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.575

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.25
Baltimore T6	6.25
Boston T6	6.80
Buffalo S40	6.25
Cleveland J5	6.25
Cleveland A7	6.25
Conshohocken,Pa. A3	6.30
Dearborn,Mich. D3	6.35
Detroit D2, M1, P20	6.35
Dover,O. G6	6.25
Ecorse,Mich. G5	6.35
Follansbee,W.Va. F4	6.25
Fontana,Calif. K1	8.00
FranklinPark,Ill. T6	6.35
Ind.Harbor,Ind. I-2	6.35
Ind.Harbor,Ind. Y1	6.25
Indianapolis C8	6.40
Lackawanna,N.Y. B2	6.25
LosAngeles C1	*8.30*
NewBedford,Mass. R10	6.70
NewBritain(10) S15	6.25
NewCastle,Pa. B4, E5	6.25
NewHaven,Conn. A7	7.00
NewHaven,Conn. D2	6.70
NewKensington,Pa. A6	6.25
Pawtucket,R.I. R3	6.90
Pawtucket,R.I. N8	6.80
Pittsburgh J5	6.25
Portsmouth,O. P12	6.25
Riverdale,Ill. A1	6.35
Rome,N.Y.(32) R6	6.25
Sharon,Pa. S3	6.25
SparrowsPt.,Md. B2	6.25
Trenton,N.J.(31) R5	7.80
Wallingford,Conn. W2	6.70
Warren,O. R2, T5	6.25
Weirton,W.Va. W6	6.25
Worcester,Mass. A7	7.10
Youngstown Y1	6.25
Youngstown C8	6.25

STRIP, Cold-Rolled Alloy

Boston T6	13.80
Carnegie,Pa. S18	13.45
Cleveland A7	13.45
Dover,O. G6	13.45
FranklinPark,Ill. T6	13.45
Harrison,N.J. C18	13.45
Indianapolis C8	13.60
Pawtucket,R.I. N8	13.80
Sharon,Pa. S3	13.45
Worcester,Mass. A7	13.75
Youngstown C8	13.45

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland A7	9.10
Dearborn,Mich. D3	9.20
Dover,O. G6	9.30
Ecorse,Mich. G5	9.20
Ind.Harbor,Ind. Y1	9.30
Lackawanna,N.Y. B2	9.10
Sharon,Pa. S3	9.10
SparrowsPoint,Md. B2	9.10
Warren,O. R2	9.10
Weirton,W.Va. W6	9.10
Youngstown Y1	9.30

STRIP, Electrogalvanized

Cleveland A7	6.25*
Dover,O. G6	6.25*
Riverdale,Ill. A1	6.55*
Youngstown C8	6.25*
Warren,O. T5	6.25*
Warren,O. B9	6.45*
Weirton,W.Va. W6	5.75*
Worcester,Mass. A7	7.10*

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*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	6.55

TIGHT COOPERAGE HOOP

Atlanta A11	5.05
Riverdale,Ill. A1	4.90
Sharon,Pa. S3	4.75
Youngstown U5	4.75

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	7.30	9.25	10.80	12.95	15.65
Boston T6	7.55	9.25	10.80	12.95	15.65
Bristol,Conn. W1	...	...	10.80	12.95	15.65
Carnegie,Pa. S18	...	8.95	10.50	12.65	....
Cleveland A7	*7.10*	*9.05*	*10.60*	*12.75*	*15.45*
Cleveland C7	...	8.95	10.50	12.65	15.35
Dearborn,Mich. D3	7.10	9.05	10.60	....	....
Detroit D2	7.10	9.05	10.60	12.75	....
Dover,O. G6	7.00	8.95	10.50	12.65	15.35
Follansbee,W.Va. F4	7.00	8.95	10.50**	....	....
FranklinPark,Ill. T6	7.10	8.95	10.50	12.65	15.35
Harrison,N.J. C18	...	...	10.80	12.95	15.65
Indianapolis C8	7.15	9.10	10.50	12.65	15.35
NewBritain,Conn.(10) S15	7.00	8.95	10.50	12.65	15.35
NewCastle,Pa. B4, E5	7.00	8.95	10.50	12.65	....
NewHaven,Conn. D2	7.45	9.25	10.80	12.95	....
NewKensington,Pa. A6	7.00	8.95	10.50	....	....
NewYork W3	...	9.25	10.80	12.95	15.65
Pawtucket,R.I. N8	7.55	9.25	10.80	12.95	15.35
Riverdale,Ill. A1	7.10	8.95	10.50	12.65	15.35
Rome,N.Y.(32) R6	7.00	8.95	10.50	12.65	15.35
Sharon,Pa. S3	7.00	8.95	10.50	12.65	15.35
Trenton,N.J. R5	...	9.25	10.80	12.95	15.65
Wallingford,Conn. W2	7.45	9.25	10.80	12.95	15.65
Warren,O. T5	7.00	8.95	10.50	12.65	15.35
Weirton,W.Va. W6	7.00	8.95	10.50	12.65	15.35
Worcester,Mass. T6	7.55	9.25	10.80	12.95	15.65
Worcester,Mass. A7	*7.95*	*9.35*	*10.90*	*13.05*	*15.75*
Youngstown C8	7.00	8.95	10.50	12.65	15.35

**0.065 C, max.

Spring Steel (Tempered)					
Bristol,Conn. W1	...	...	14.40	17.60	....
Buffalo, W12	...	...	14.40	....	....
FranklinPark,Ill. T6	...	...	14.90	18.10	21.50
Harrison,N.J. C18	...	...	14.40	17.60	21.00
NewYork W3	...	...	14.40	17.60	21.00
Trenton,N.J. R5	...	...	14.40	17.60	21.00
Worcester,Mass. T6	...	...	14.40	17.60	21.00
Worcester,Mass. W12	...	...	14.40	....	....
Worcester,Mass. A7	...	...	*14.50*	*17.70*	*21.10*
Youngstown C8	...	...	14.75	17.95	21.35

SILICON STEEL

H.R. SHEETS(22 Ga.,cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	...	9.95	10.95	11.85
Brackenridge,Pa. A4	...	...	9.95	10.95	11.85
Mansfield,O. E6	8.40	9.35	9.95	10.95	11.85
Newport,Ky. N9	8.40	9.35	9.95	10.95	11.85
Niles,O. N12	8.40	9.35	9.95	10.95	....
Vandergrift,Pa. U5	...	9.35	9.95	10.95	11.85
Warren,O. R2	8.40	9.35	9.95	10.95	11.85
Zanesville,O. A10	...	9.35	9.95	10.95	11.85

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	...	...	10.70	11.70	12.60
GraniteCity,Ill. G4	8.80*	9.80*	10.40*	11.40*	....
IndianaHarbor,Ind. I-2	8.60†	9.60*	10.20*	11.20*	....
Vandergrift,Pa. U5	...	10.10†	10.70†	11.70†	12.60†
Vandergrift,Pa. U5	8.60*	9.60*	10.20*	11.20*	12.10*
Warren,O. R2	8.60†	10.10	10.70	11.70	12.60
Zanesville,O. A10	...	10.10	10.70	11.70	12.60

	Transformer Grade			
H.R. SHEETS (22 Ga., cut lengths)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	12.80	13.35	13.85	14.85
Brackenridge,Pa. A4	12.80	....	....	....
Newport,Ky. N9	12.80	....	....	....
Vandergrift,Pa. U5	12.80	13.35	13.85	14.85
Zanesville,O. A10	12.80§	13.35§	13.85§	14.85§

	Grain Oriented				
C.R. COILS & CUT LENGTHS (22 Ga.)	T-100	T-90	T-80	T-73	T-72
Brackenridge,Pa. A4	....	15.85	17.45	17.95	13.55§
Butler,Pa. A10	....	....	17.45	17.95	....
Vandergrift,Pa. U5	14.85	15.85	17.45	17.95	13.55
Warren,O. R2	....	....	....	....	13.55‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. §Coils, ¾-cent higher.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.90	$8.15	$8.55
Dravosburg,Pa. U5	7.90	8.15	8.55
Fairfield,Ala. T2	8.00	8.25	8.65
FairlessHills,Pa. U5	8.00	8.25	8.65
Gary,Ind. U5	7.90	8.15	8.55
GraniteCity,Ill. G4	8.00	8.25	8.65
IndianaHarbor,Ind. I-2, Y1	7.90	8.15	8.55
Niles,O. R2	7.90	8.15	8.55
Pittsburg,Calif. C11	8.65	8.90	9.30
SparrowsPoint,Md. B2	8.00	8.25	8.65
Weirton,W.Va. W6	7.90	8.15	8.55
Yorkville,O. W10	7.90	8.15	8.55

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	6.575	....	....
Niles,O. R2	7.075	7.275	7.475

TINPLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.20	$9.45
Dravosburg,Pa. U5	9.20	9.45
Fairfield,Ala. T2	9.30	9.55
Fairless,Pa. U5	9.30	9.55
Gary,Ind. U5	9.20	9.45
Ind.Har. I-2, Y1	9.20	9.45
Pitts.,Calif. C11	9.95	10.20
Sp.Pt.,Md. B2	9.30	9.55
Weirton,W.Va. W6	9.20	9.45
Yorkville,O. W10	9.20	9.45

BLACK PLATE, (Base Box)

Aliquippa,Pa. J5	$7.00
Dravosburg,Pa. U5	7.00
Fairfield,Ala. T2	7.10
FairlessHills,Pa. U5	7.10
Gary,Ind. U5	7.00
GraniteCity,Ill. G4	7.10
Ind.Harbor,Ind. I-2, Y1	7.00
Niles, O. R2	7.00
Pittsburg,Calif. C11	7.75
SparrowsPoint,Md. B2	7.10
Warren,O. R2	7.00
Weirton,W.Va. W6	7.00
Yorkville,O. W10	7.00

HOLLOWARE ENAMELING Black Plate (29 Gage)

Dravosburg,Pa. U5	6.65
Gary,Ind. U5	6.65
GraniteCity,Ill. G4	6.75
Ind.Harbor,Ind. Y1	6.65
Yorkville,O. W10	6.65

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg,Pa. U5	$8.70
Gary,Ind. U5	8.70

MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)

Yorkville,O. W10	$9.15

ROOFING SHORT TERNES (8 lb Coated; Base Box)

Gary,Ind. U5	$10.25

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	6.25
Aliquippa,Pa. J5	6.25
Alton,Ill. L1	6.425
Atlanta A11	6.45
Bartonville,Ill. K4	6.35
Buffalo W12	6.25
Chicago W13	6.25
Cleveland A7	6.25
Crawfordsville,Ind. M8	6.35
Donora,Pa. A7	6.25
Duluth,Minn. A7	6.25
Fairfield,Ala. T2	6.25
Fostoria,O.(24) S1	6.45
Houston S5	6.50
Jacksonville,Fla. M8	6.77
Johnstown,Pa. B2	6.25
Joliet,Ill. A7	6.25
KansasCity,Mo. S5	6.50
Kokomo,Ind. C16	6.35
LosAngeles B3	7.20
Minnequa,Colo. C10	6.50
Monessen,Pa. P7	6.25
Newark 6-8 ga. I-1	6.90
N.Tonawanda B11	6.25
Palmer,Mass. W12	6.55
Pittsburgh,Calif. C11	7.20
Portsmouth,O. P12	6.25
Rankin,Pa. A7	6.25
S.Chicago,Ill. R2	6.25
S.SanFrancisco C10	7.20
SparrowsPoint,Md. B2	6.35
Sterling,Ill.(1) N15	6.25
Sterling,Ill. N15	6.35
Struthers,O. Y1	6.25
Waukegan,Ill. A7	6.25
Worcester,Mass. A7	6.55

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	7.90
Alton,Ill. L1	8.075
Bartonville,Ill. K4	8.00
Buffalo W12	7.90
Cleveland A7	7.90
Donora,Pa. A7	7.90
Duluth,Minn. A7	7.90
Fostoria,O. S1	7.95
Johnstown,Pa. B2	7.90
LosAngeles B3	8.85
Milbury,Mass.(12) N6	8.20
Minnequa,Colo. C10	8.15
Monessen,Pa. P16	7.90
Muncie,Ind. I-7	8.10
Palmer,Mass. W12	8.20
Pittsburg,Calif. C11	8.85
Portsmouth,O. P12	7.90
Roebling,N.J. R5	8.20
S.Chicago,Ill. R2	7.90
S.SanFrancisco C10	8.85
SparrowsPt.,Md. B2	8.00
Struthers,O. Y1	7.90
Trenton,N.J. A7	8.20
Waukegan,Ill. A7	7.90
Worcester A7,J4,T6,W12	8.20

WIRE, Upholstery Spring

Aliquippa,Pa. J5	7.60
Alton,Ill. L1	7.775
Buffalo W12	7.60
Cleveland A7	7.60
Donora,Pa. A7	7.60
Duluth,Minn. A7	7.60
Johnstown,Pa. B2	7.60
KansasCity,Mo. S5	7.85
LosAngeles B3	8.55
Minnequa,Colo. C10	7.775
Monessen,Pa. P16	7.60
NewHaven,Conn. A7	7.90
Palmer,Mass. W12	7.90
Pittsburg,Calif. C11	8.55
Portsmouth,O. P12	7.60
Roebling,N.J. R5	7.90
S.Chicago,Ill. R2	7.60
S.SanFrancisco C10	8.55
SparrowsPoint,Md. B2	7.70
Struthers,O. Y1	7.60
Trenton,N.J. A7	7.90
Waukegan,Ill. A7	7.60
Worcester,Mass. A7	7.90

WIRE, Fine & Weaving(8"Coils)

Alton,Ill. L1	12.725
Bartonville,Ill. K4	12.65
Buffalo W12	12.55
Chicago W13	12.55
Cleveland A7	12.55
Crawfordsville,Ind. M8	12.65
Fostoria,O. S1	12.55
Jacksonville,Fla. M8	13.08
Johnstown,Pa. B2	12.55
Kokomo,Ind. C16	12.55
Minnequa,Colo. C10	12.30
Monessen,Pa. P16	12.55
Muncie,Ind. I-7	12.75
Palmer,Mass. W12	12.85
Roebling,N.J. R5	12.85
S.SanFrancisco C10	12.90
Waukegan,Ill. A7	12.55
Worcester,Mass. A7,T6	12.85

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4	10.70
Buffalo W12	10.70
Johnstown,Pa. B2	10.70
Minnequa,Colo. C10	10.825
Monessen,Pa. P16	10.70
Muncie,Ind. I-7	10.90
Pittsburg,Calif. C11	11.50
Portsmouth,O. P12	10.70
Roebling,N.J. R5	11.00
SparrowsPt.,Md. B2	10.80

ROPE WIRE	(A)
Bartonville,Ill. K4	10.55
Buffalo W12	10.55
Fostoria,O.(23) S1	10.55
Johnstown,Pa. B2	10.55
Monessen,Pa. P16	10.55
Muncie,Ind. I-7	10.75
Palmer,Mass. W12	10.85
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.85
SparrowsPt. B2	10.65
Struthers,O. Y1	10.55
Worcester,Mass. J4	10.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE
(Continued)

WIRE, Tire Bead

Bartonville.Ill. K4	14.15
Monessen.Pa. P16	14.20
Roebling.N.J. R5	14.35

WIRE, Cold-Rolled Flat

Anderson.Ind. G6	9.00
Baltimore T6	9.30
Buffalo W12	9.00
Cleveland A7	9.00
Crawfordsville.Ind. M8	9.00
Dover.O. G6	9.00
Fostoria.O. S1	9.00
FranklinPark.Ill. T6	9.10
Kokomo.Ind. C16	9.00
Massillon.O. R8	9.00
Milwaukee C23	9.20
Monessen.Pa. P16	9.00
Pawtucket.R.I. N8	9.30
Riverdale.Ill. A1	9.10
Rome.N.Y. R6	9.00
Trenton.N.J. R5	9.30
Worcester A7, T6, W12	9.30

NAIL, Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity.Ala. R2	152
Aliquippa.Pa. J5	152
Atlanta A11	154
Bartonville.Ill. K4	154
Chicago.Ill. W13	152
Cleveland A9	157
Crawfordsville.Ind. M8	154
Donora.Pa. A7	152
Duluth.Minn. A7	152
Fairfield.Ala. T2	152
Galveston.Tex. D7	157
Houston.Tex. S5	157
Johnstown.Pa. B2	152
Joliet.Ill. A7	152
KansasCity.Mo. S5	157
Kokomo.Ind. C16	154
Minnequa.Colo. C10	157
Monessen.Pa. P7	152
Pittsburg Calif. C11	171
Rankin Pa. A7	152
S.Chicago.Ill. R2	152
SparrowsPt.,Md. B2	154
Sterling.Ill.(1) N15	152
Worcester.Mass. A7	158

NAILS, CUT (100 lb keg)

To Dealers (33)	
Conshohocken.Pa. A3	$9.05
Wheeling.W.Va. W10	9.05

STAPLES, Polished Stock

To Dealers & Mfrs. (7)	Col.
Aliquippa.Pa. J5	152
Atlanta A11	154
Bartonville.Ill. K4	154
Crawfordsville.Ind. M8	154
Donora,Pa. A7	152
Duluth.Minn. A7	152
Fairfield.Ala. T2	152
Johnstown.Pa. B2	152
Joliet.Ill. A7	152
Kokomo.Ind. C16	154
Minnequa Colo. C10	157
Monessen.Pa. P7	152
Pittsburg.Calif. C11	171
Rankin Pa. A7	152
SparrowsPt.,Md. B2	154
Sterling.Ill.(1) N15	152
Worcester.Mass. A7	158

TIE WIRE, Automatic Baler (14½ Ga.) (Per 97 lb Net Box)

Coil No. 3150	
AlabamaCity.Ala. R2	$9.35
Bartonville.Ill. K4	9.45
Buffalo W12	9.35
Crawfordsville.Ind. M8	9.46
Donora.Pa. A7	9.35
Duluth.Minn. A7	9.35
Johnstown.Pa. B2	9.35
Joliet Ill. A7	9.35
Kokomo.Ind. C16	9.45
LosAngeles B3	10.14
Minnequa.Colo. C10	9.60
Pittsburg Calif. C11	10.43
S.Chicago Ill. R2	9.35
SparrowsPt.,Md. B2	9.45
Sterling.Ill. N15	9.35

Coil No. 6500 Stand.	
AlabamaCity.Ala. R2	$9.65
Bartonville.Ill. K4	9.75
Buffalo W12	9.60
Crawfordsville.Ind. M8	9.75
Donora.Pa. A7	9.65
Duluth.Minn. A7	9.65
Johnstown.Pa. B3	9.65
Joliet.Ill. A7	9.65
Kokomo.Ind. C16	9.75
LosAngeles B3	10.45
Minnequa.Colo. C10	9.90
Pittsburg.Calif. C11	10.13
S.Chicago Ill. R2	9.65
SparrowsPt.,Md. B2	9.75
Sterling.Ill. N15	9.65

Coil No. 6500 Interim	
AlabamaCity Ala. R2	$9.70
Bartonville Ill. K4	9.80
Buffalo W12	9.70
Crawfordsville.Ind. M8	9.80
Donora.Pa. A7	9.70
Duluth.Minn. A7	9.70
Johnstown.Pa. B2	9.70
Joliet.Ill. A7	9.70
Kokomo.Ind. C16	9.80
LosAngeles B3	10 50
Minnequa.Colo. C10	9.95
Pittsburg.Calif. C11	10.50
S.Chicago.Ill. R2	9.70
SparrowsPt.,Md. B2	9.80
Sterling.Ill. N15	9.70

WIRE, Barbed	Col.
AlabamaCity.Ala. R2	175**
Aliquippa J5	172‡
Atlanta A11	181
Bartonville Ill. K4	181
Crawfordsville.Ind. M8	181
Donora.Pa. A7	175†
Duluth Minn. A7	175†
Fairfield Ala. T2	175†
Houston Tex. S5	180†
Johnstown.Pa. B2	179*
Joliet.Ill. A7	175†
KansasCity.Mo. S5	180†
Kokomo.Ind. C16	177†
Minnequa.Colo. C10	180**
Monessen.Pa. P7	179*
Pittsburg.Calif. C11	195†
Rankin.Pa. A7	175†
S.Chicago.Ill. R2	175**
S.SanFrancisco C10	195**
SparrowsPoint.Md. B2	181*
Sterling.Ill.(1) N15	179*

WOVEN Fence, 9-15 ga.	Col.
Ala.City Ala. R2	162**
Ala.City. 17 ga. R2	241**
Ala.City. 18 ga. R2	251**
Aliq'ppa.Pa.9-14½ga J5	165§
Atlanta A11	168
Bartonville.Ill. K4	168
Crawfordsville Ind. M8	168
Donora Pa. A7	162†
Duluth.Minn. A7	162†
Fairfield Ala. T2	162†
Houston.Tex. S5	167†
Johnstown Pa.(43) B2	166
Joliet.Ill. A7	162†
KansasCity. Mo. S5	167†
Kokomo Ind. C16	164†
Minnequa.Colo. C10	167**
Monessen.Pa. 9 ga. P17	166*
Pittsburg.Calif. C11	185†
Rankin Pa. A7	162†
S.Chicago Ill. R2	162**
Sterling.Ill.(1) N15	166*

Wire (16 Gage)	An'ld Stone	Galv. Stone
Ala.City R2	14.50	16.05**
Bartonville K4	14 60	16.50
Buffalo W12	14.50	....
Cleveland A7	14.50	....
Crawf'dsville M8	14 60	16 50
Fostoria,O. S1	14.60	16.15†
Johnstown B2	14.15	16.40*
Kokomo C16	14 60	16.15†
Minnequa C10	14.75	16.45**
Palmer MassW12	14 50	16.05*
Pitts. Calif. C11	14.85	16.40†
S.Chicago R2	14.50	16.05**
SparrowsPt. B2	14 60	16.50*
Sterling(1) N15	14.50	16.45††
Waukegan A7	14.50	16.05†
Worcester A7	14.80	....

WIRE, Merchant Quality (6 to 8 gage)	An'ld	Galv.
Ala.City.Ala. R2	7.40	7.80**
Aliquippa J5	7.40	7.925§
Atlanta A11	7.50	8.075
Bartonville(48) K4	7.50	8.075
Buffalo W12	7.40	8.80†
Cleveland A7	7.40	....
Crawfordsville M8	7.50	8.075
Donora.Pa. A7	7.40	7.80†
Duluth.Minn. A7	7.40	7.80†
Fairfield T2	7.40	7.80†
Houston.Tex. S5	7.65	8.05†
Jacks'ville.Fla.M8	7.90	8.475
Johnstown B2(48)	7.40	7.975*
Joliet.Ill. A7	7.40	7.80†
KansasCity.Mo. S5	7.65	8.05†
Kokomo C16	7.50	7.90†
LosAngeles B3	8.35	8.925*
Minnequa C10	7.65	8.05**
Monessen P7 (48)	7.40	7.975*
Palmer.Mass. W12	7.70	8.10†
Pitts.,Calif. C11	8.35	8.75†
Portsmouth,O. P12	7.40	....
Rankin A7	7.40	7.80†
S.Chicago R2	7.40	7.80**
S.SanFran. C10	8.35	8.75**
Spar'wsPt.B2(48)	7.50	8.075*
Str'ing(1)(48)N15	7.40	8.00††
Struthers,O.(48)Y1	7.40	7.90‡
Worcester.Mass.A7	7.70	....

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*Based on 12.50c zinc; †5c zinc; §10c zinc; ‡Less than 10c zinc; **Subject to zinc equalization extras. ††13c zinc.

BALE TIES, Single Loop	Col.
AlabamaCity.Ala. R2	173
Atlanta A11	175
Bartonville.Ill. K4	175
Crawfordsville.Ind. M8	175
Donora.Pa. A7	173
Duluth.Minn. A7	173
Fairfield.Ala. T2	173
Joliet.Ill. A7	173
Houston S5	178
KansasCity.Mo. S5	178
Kokomo,Ind. C16	175
Minnequa Colo. C10	178
S.Chicago R2	173
S.SanFran.,Calif. C10	197
SparrowsPoint.Md. B2	175
Sterling.Ill.(1) N15	173

FENCE POSTS

	Col.
ChicagoHts.,Ill. C2, I-2	157
Duluth Minn. A7	157
Franklin.Pa. F5	157
Huntington.W.Va. W7	157
Johnstown.Pa. B2	160
Marion O. P11	157
Minnequa.Colo. C10	162
Mol'ne.Ill. R2	162
S.Chicago.Ill. R2	157
Tonawanda.N.Y. B12	157
Williamsport.Pa. S10	160

FASTENERS

(Base discounts, full case quantity, per cent off list to consumer, f.o.b. mill)

Carriage, Machine Bolts	
Full-Size Body (cut thread)	
†¼" x 6" and smaller	61
Larger than ½" diam. and all diams. longer than 6"	55
Under-Size Body (rolled thread; not nutted):	
½" x 6" and smaller	61
Carriage, Machine & Lag Bolts, Hot Galvanized:	
½" and smaller	42
Larger than ½" diam. and all diams. longer than 6"	32

†½" x 4" and smaller and shorter are not nutted.

Lag Bolts	
All diams. & 6" and shorter	61
All diams. longer than 6"	55
Plow, Tap & Blank Bolts	
½" x 6" and smaller	61
Larger than ½" diam. and all diams. longer than 6"	55
Ribbed Neck, Carriage, Step, Elevator, Fitting-Up and Tire Bolts:	
All sizes	61
STOVE BOLTS, SLOTTED (nuts not attached; bulk)	
⅛" to ¼" diam. incl., 3" or shorter:	
25.000 to 199 999 pieces	61
200.000 or more pieces	64
$\frac{5}{16}$" to ½" diam. incl., 3" or shorter:	
15.000 to 99.999 pieces	61
100.000 or more pieces	64
Longer than 3", any diam.:	
5000 to 99.999 pieces	61
100.000 or more pieces	64

RIVETS

F.o.b. Cleveland, and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger	9.95
$\frac{7}{16}$-in. under	List less 32%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft. mill; minimum wall thickness, cut lengths 10 to 24 ft. inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	21.06	20.42
1¼	13	....	24.94	20.45
1½	13	23.31	27.57	22.61
1¾	13	27.54	32.57	26.71
2	13	30.87	36.51	29.93
2¼	13	34.77	41.12	33.72
2½	12	37.73	44.63	36.60
2¾	12	41.57	49.16	40.31
2⅞	12	45.00	53.22	43.65
3	12	47.99	56.76	46.55

RAILWAY MATERIALS

RAILS	Standard No. 1	Standard No. 2	Tee Rails All No. 2	Tee Rails 60 lb Under
Bessemer.Pa. U5	4.725	4.625	4.675	5.65
Ensley.Ala. T2	4.725	4.625	....	5.65
Fairfield.Ala. T2	....	....	....	5.65
Gary.Ind. U5	4.725	....	....	...
Huntington.W.Va. W7	....	....	....	5.65
IndianaHarbor.Ind. I-2	4.725	4.625	4.675	...
Johnstown Pa. B2	....	....	...	(16)5.65
Lackawanna.N.Y. B2	4.725	4.625	....	5.65
Minnequa.Colo. C10	4.725	4.625	....	6.15
Steelton Pa. B2	4.725	4.625	....	...
Williamsport.Pa. S19	....	....	....	5.65

TIE PLATES	
Fairfield.Ala. T2	5.625
Gary.Ind. U5	5.625
Ind.Harbor.Ind. I-2	5.625
Lackawanna.N.Y. B2	5.625
Minnequa.Colo. C10	5.625
Seattle B3	5.775
Steelton.Pa. B2	5.625
Torrance.Calif. C11	5.775

TRACK BOLTS (20) Treated	
Cleveland R2	12.40
KansasCity.Mo. S5	12.40
Lebanon.Pa. B2	12.40
Minnequa.Colo. C10	12.40
Pittsburgh O3, P14	12.40
Seattle B3	12.90

AXLES	
Ind.Harbor.Ind. S13	7.25
Johnstown.Pa. B2	7.25

JOINT BARS	
Bessemer.Pa. U5	5.825
Fairfield.Ala. T2	5.825
Ind.Harbor.Ind. I-2	5.825
Joliet.Ill. U5	5.825
Lackawanna.N.Y. B2	5.825
Minnequa.Colo. C10	5.825
Steelton.Pa. B2	5.825

SCREW SPIKES	
Cleveland R2	11.90
Pittsburgh O3	11.90

STANDARD TRACK SPIKES	
Fairfield.Ala. T2	7.90
Ind.Harbor.Ind. I-2, Y1	7.90
KansasCity.Mo. S5	7.90
Lebanon.Pa. B2	7.90
Minnequa.Colo. C10	7.90
Pittsburgh J5	7.90
Seattle B3	8.40
S.Chicago.Ill. R2	7.90
Struthers.O. Y1	7.90
Youngstown R2	7.90

METAL POWDER

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge iron:	
98+% Fe, annealed	9.25
Unannealed:	
Minus 100 mesh	11.75
Minus 35 mesh	8.25
Minus 20 mesh	9.00
Swedish, c.i.f. Camden, N. J., c.l. in bags	9.50
Domestic (Swedish), f.o.b. Riverton, N.J., in bags	9.50
Canadian, fo.o.b. Shipping point	9.50
Electrolytic iron:	
Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	22.00
Annealed, 99.5% Fe	36.50
Unannealed (99+% Fe)	34.00
Unannealed (99+% Fe) (minus 325 mesh)	57.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl Iron:	
97.9-99.8% size 5 to 10 microns	83.00-148.00
Aluminum:	
Atomized, 500 lb. drum frght. allowed	
Carlots	34.50
Ton lots	36.50
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	38.00-50.00†
Bronze, 5000-lb lots	61.25-64.50†
Copper:	
Electrolytic	56.75
Reduced	56.75
Lead	22.80
Manganese:	
Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.00
Nickel-Silver, 5000-lb lots	58.75-61.50†
Phosphor-Bronze, ¼-ton lots	58.50
Silicon	47.50
Solder	7.00*
Stainless Steel, 302	99.00
Stainless Steel, 316	$1.32
Tin	14.50*
Zinc, 5000-lb lots	18.75-32.50‡
Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh:	
1000 lb and over	4.50
Less than 1000 lb.	4.65
Chromium, electrolytic 99.2% Cr min.	3.50

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*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago Base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25 off for untreated.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Mild plow, 10.55c.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.25c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill and 0.45c for carbon, add 0.40c for alloy and 0.45c H.S.-L.A.
(31) Widths over ⅝-in.; 6.90c for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 Ga. & heavier; 60" & narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.25c.
(43) 9-14½ Ga.
(48) 6-7 Ga.

SEAMLESS STANDARD PIPE, Threaded and Coupled Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25
Ambridge, Pa. N2	6.5	..	10.5	...	13	...	14.5	...	14.5	...	14	...	16.5	...
Lorain, O. N3	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25
Youngstown Y1	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled Carload discounts from list, %

Youngstown R2	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25

BUTTWELD STANDARD PIPE, Threaded and Coupled Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Alton, Ill. L1	...	...	....	....	....	....	15.5	+1.75	18.5	2.25	21	5.75	23.5	7
Benwood, W. Va. W10	16.5	+12	7.25	+18.25	+1.75	+26.25	17.5	0.25	20.5	4.75	23	7.75	25.5	7
Butler, Pa. F6	17.5	+11	9	+16.5	0.5	+24	...	...	...	...	...	...	...	...
Etna, Pa. N2	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Fairless Hills, Pa. N3	...	...	....	....	....	....	15.5	+1.75	18.5	2.75	21	5.75	23.5	7
Fontana, Calif. K1	...	...	....	....	....	....	6	+11.25	9	+7.25	11.5	+3.75	14	+2.5
Ind. Harbor, Ind. Y1	...	...	....	....	....	....	16.5	+0.75	19.5	3.25	22	6.75	24.5	8
Lorain, O. N3	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Sharon, Pa. S4	17.5	+11	9	+16.5	0.5	+24	...	...	...	...	...	...	...	...
Sharon, Pa. M6	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Sparrows Pt., Md. B2	15.5	+13	7	+18.5	+1.5	+26	15.5	+1.75	18.5	2.25	21	5.75	23.5	7
Youngstown R2, Y1	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Wheatland, Pa. W9	17.5	+11	9	+16.5	0.5	+24	17.5	0.25	20.5	4.25	23	7.75	25.5	9

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	26	10	26.5	10.5	28	10.75	28	10.75	....	...	....	...
Alton, Ill. L1	24	8	24.5	8.5	26	8.75	26	8.75	....	...	....	...
Benwood, W. Va. W10	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Etna, Pa. N2	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Fairless Hills, Pa. N3	24	8	24.5	8.5	26	8.75	26	8.75	16.5	+1.25	16.5	+1.25
Fontana, Calif. K1	14.5	+1.5	15	+1	16.5	+0.75	16.5	+0.75	7	+10.75	7	+10.75
Ind. Harbor, Ind. Y1	25	9	25.5	9.5	27	9.75	27	9.75	17.5	+0.25	17.5	+0.25
Lorain, O. N3	26	10	26.5	10.5	28	10.75	28	10.75	....	...	....	...
Sharon, Pa. M6	26	10	26.5	10.5	28	10.75	28	10.75	....	...	....	...
Sparrows Pt., Md. B2	24	8	24.5	8.5	26	8.75	26	8.75	16.5	+1.25	16.5	+1.25
Youngstown R2, Y1	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Wheatland, Pa. W9	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75

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*Galvanized pipe discounts based on current price of zinc (13.00c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	H.R. Strip	Shapes; H.R. & C.F. Bars; Wire	Plates	Sheets	C.R. Strip; Flat Wire
201	17.00	21.50	....	....	31.00	....	....	42.25	39.00
202	18.25	24.00	31.00	36.25	33.50	36.75	38.75	42.50	42.50
301	17.75	22.25	....	36.75	32.00	38.00	....	44.25	41.00
302	19.00	24.75	32.00	37.25	34.50	38.25	40.25	44.50	44.50
302B	20.25	26.50	33.00	37.25	37.75	38.25	40.25	47.00	47.00
303	....	26.75	34.75	40.00	....	41.00	....	....	....
304	20.25	26.00	33.75	39.00	37.25	40.25	43.00	47.25	47.25
304L	....	....	38.75	44.00	42.25	45.25	48.00	52.25	52.25
305	21.75	28.25	....	39.50	40.25	40.25	43.50	50.25	50.25
308	22.00	29.00	38.50	44.25	41.25	45.50	49.75	52.00	52.00
309	29.50	38.25	46.75	53.50	53.50	54.75	58.25	67.00	67.00
309S	31.50	41.00	51.00	59.00	58.50	60.25	63.75	74.00	74.00
310	37.25	48.00	62.25	72.25	68.50	73.50	75.25	78.75	78.75
314	....	....	....	....	....	....	75.25	....	....
316	31.50	40.25	51.25	59.50	58.25	60.75	64.00	68.25	68.25
316L	....	....	56.25	64.75	63.25	65.75	69.25	73.25	73.25
317	37.25	48.25	62.75	72.75	73.50	74.50	77.00	83.75	83.75
321	25.00	32.00	38.25	44.00	44.25	45.25	49.25	54.25	54.25
18-8CbTa	29.25	38.00	45.75	52.25	53.25	53.50	58.00	66.50	66.50
403	....	....	28.75	32.75	....	34.00	36.25	....	44.00
405	17.50	23.00	26.75	31.00	32.25	32.00	33.75	42.25	42.25
410	15.00	19.50	25.50	29.50	28.00	30.50	31.75	36.25	36.25
416	....	....	26.00	30.00	....	31.00	....	....	....
420	23.50	30.25	31.00	36.00	37.75	37.25	40.75	56.00	56.00
430	15.25	19.75	26.00	30.00	28.75	31.00	32.25	36.75	36.75
430F	....	....	26.50	30.50	....	31.50	....	....	....
431	16.00	20.50	26.50	30.50	29.75	31.50	33.00	38.00	38.00
446	....	....	35.50	40.50	53.25	42.00	43.25	63.25	63.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Tube Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co., Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates Carbon Base		Sheets Carbon Base
Stainless:	10%	20%	20%
302	....	....	30.50
304	30.30	36.05	32.50
304-L	32.30	37.95	....
310	41.30	47.00	....
316	35.50	41.40	47.00
316-L	40.00	46.10	....
316-CB	41.15	48.45	....
321	32.00	37.75	37.25
347	34.40	41.40	48.25
405	25.80	33.35	....
410	25.30	32.85	....
430	25.30	32.85	....
Inconel	49.45	65.45	....
Nickel	41.05	55.65	....
Nickel, Low Carbon	43.25	60.05	....
Monel	*43.95*	*59.55*	....
Copper*	....	....	46.00

	Strip, Carbon Base Cold Rolled 10%	Strip, Carbon Base Cold Rolled Both Sides
Copper*	30.00	38.00

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*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.275	5%Cr Hot Work	0.430-0.460
Extra Carbon	0.330	W-Cr Hot Work	0.450
Special Carbon	0.390	V-Cr Hot Work	0.470
Oil Hardening	0.430	Hi-Carbon-Cr	0.770

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	4.090
18.25	4.25	1	4.75	...	2.305-2.475
18	4	2	9	...	2.675-2.6775
18	4	2	....	...	1.765
18	4	1	....	...	1.600
13.75	3.75	2	5	...	2.245
13.5	4	3	....	...	1.865
9	3.5	..	....	...	1.180
6	4	2	....	5	1.105
6	4	3	....	6	1.350
1.5	4	1	....	8.5	0.960

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, M14, S8, U4, V2 and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
AlabamaCity,Ala. R2	54.50	55.00‡	....	....
Birmingham R2	54.50	55.00‡	....	....
Birmingham U6	....	55.00‡	59.00	....
Woodward,Ala. W15	54.50	55.00‡	59.00	....
Cincinnati, deld.	....	62.70	....	....
Buffalo District				
Buffalo H1, R2	58.50	59.00	59.50	60.00
Tonawanda,N.Y. W12	58.50	59.00	59.50	60.00
N.Tonawanda,N.Y. T9	....	59.00	59.50	60.00
Boston, deld.	69.15	69.65	70.15	....
Rochester,N.Y. deld.	61.52	62.02	62.52	....
Syracuse,N.Y. deld.	62.62	63.12	63.62	....
Chicago District				
Chicago I-3	58.50	59.00	59.00	59.50
Gary,Ind. U5	58.50	....	59.00	....
S.Chicago R2	58.50	....	59.00	....
S.Chicago,Ill. Y1	58.50	59.00	59.00	59.50
S.Chicago,Ill. U5, W14	58.50	....	59.00	59.50
Milwaukee, deld.	60.67	61.17	61.17	61.67
Muskegon,Mich. deld.	....	65.30	65.30	....
Cleveland District				
Cleveland A7, R2	58.50	59.00	59.00	59.50
Akron,O., deld.	61.25	61.75	61.75	62.25
Lorain,O. N3	58.50	....	....	59.50
Mid-Atlantic District				
Bethlehem,Pa. B2	60.50	61.00	61.50	62.00
NewYork, deld.	....	64.78	65.28	....
Newark, deld.	63.52	64.02	64.52	65.02
Birdsboro,Pa. B10	60.50	61.00	61.50	62.00
Chester,Pa. P14	60.50	61.00	61.50	....
Philadelphia, deld.	62.16	62.66	63.16	....
Steelton,Pa. B2	60.50	61.00	61.50	62.00
Swedeland,Pa. A3	60.50	61.00	61.50	62.00
Philadelphia, deld.	62.16	62.66	63.16	63.66
Troy,N.Y. R2	60.50	61.00	61.50	62.00
Pittsburgh District				
NevilleIsland,Pa. P6	58.50	59.00	59.00	....
Pittsburgh (N&S sides), Aliquippa, deld.	....	60.37	60.37	60.87
McKeesRocks, deld.	....	60.04	60.04	60.54
Lawrenceville,Homestead, Wilmerding, Monaca, deld.	....	60.66	60.66	61.16
Verona,Trafford, deld.	60.69	61.19	61.19	61.69
Brackenridge, deld.	60.95	61.45	61.45	61.95
Bessemer,Pa. U5	58.50	....	59.00	59.50
Clairton,Rankin,S.Duquesne,Pa. U5	58.50	....	....	....
McKeesport,Pa. N3	58.50	....	....	59.50
Midland,Pa. C18	58.50	....	....	....

	Basic	No. 2 Foundry	Malleable	Bessemer
Youngstown District				
Hubbard,O. Y1	....	....	59.00	....
Sharpsville,Pa. S6	58.50	....	59.00	59.50
Youngstown Y1	....	....	59.00	59.50
Youngstown U5	58.50	....	....	59.50
Mansfield,O., deld.	63.40	....	63.90	64.40
Duluth I-3	58.50	59.00	59.00	59.50
Erie,Pa. I-3	58.50	59.00	59.00	59.50
Everett,Mass. E1	62.00	62.50	63.00	....
Fontana,Calif. K1	64.50	65.00	....	....
Geneva,Utah C11	58.50	59.00	....	....
GraniteCity,Ill. G4	60.40	60.90	61.40	....
Ironton,Utah C11	58.50	59.00	....	....
LoneStar,Texas L6	....	55.00*	....	....
Minnequa,Colo. C10	60.50	61.00	61.50	....
Rockwood,Tenn. T3	....	55.00‡	59.00	....
Toledo,O. I-3	58.50	59.00	59.00	59.50
Cincinnati, deld.	64.26	64.76	....	....

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*Phos. 0.51-0.75%; $56. Phos. 0.31-0.50%.

‡Intermediate (Phos. 0.31-0.69%), $56.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. G2, J1	$67.50
Buffalo H1	68.75

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls, N.Y. P15	$85.50
Keokuk,Iowa, (Open-hearth & Fdry, freight allowed K2)	90.00
Keokuk, O.H. & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	93.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$72.50
Steelton,Pa. B2 (Phos. 0.035% max)	66.50
Philadelphia, deld.	70.05
Troy,N.Y. R2 (Phos. 0.035% max)	66.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	63.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	63.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	63.50

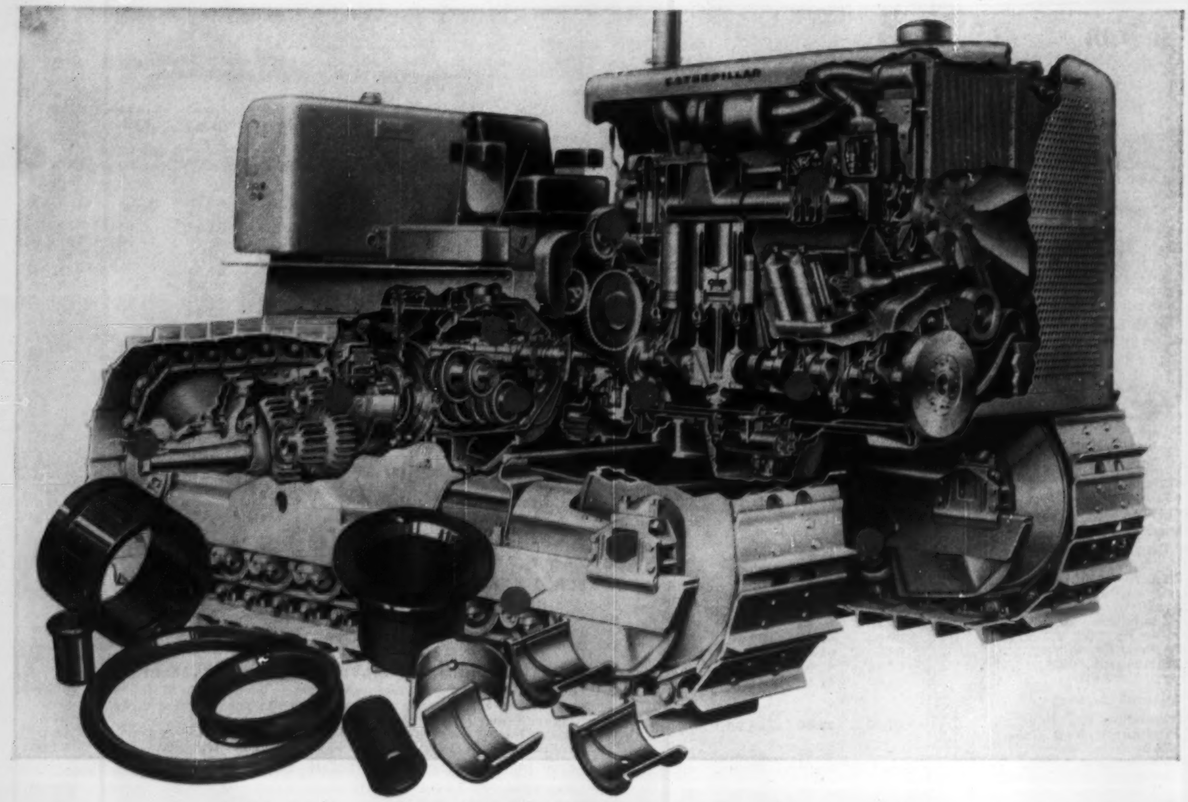
Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 25 cents per 100 lb except: Buffalo, **Cleveland, Erie, 30 cents; Moline, Norfolk, Richmond, Wa**shington, 20 cents; Birmingham, Chattanooga, Jackson, 15 cents; Baltimore, **Boston, Los Angeles, New York, Philadelphia, Portland, Sa**n Francisco, 10 cents; Atlanta, Houston, Seattle, Spokane, no charge.

	SHEETS				STRIP		BARS				PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.‡	H.R. Alloy 4140††[5]	Standard Structural Shapes	Carbon	Floor
Atlanta	7.14	8.20	8.87	....	7.40	...	7.42	9.39	....	7.63	7.49	9.48
Baltimore	7.03	8.32	8.37	....	7.65	...	7.61	8.62[3]	13.44	7.93	7.21	8.87
Birmingham	6.80	7.90	8.85	....	7.06	...	7.08	9.35	....	7.28	6.99	9.10
Boston	7.70	8.81	10.27	45.67	7.96	...	7.83	9.53	14.45	8.13	7.89	9.36
Buffalo	6.80	8.05	9.77	....	7.15	...	7.10	7.90	13.10	7.40	7.15	8.70
Chattanooga	6.95	8.10	8.60	....	7.20	...	7.20	9.18	....	7.45	7.25	9.05
Chicago	6.80	8.09	8.50	49.05	7.06	...	7.08	7.75	12.85	7.28	6.99	8.46
Cincinnati	6.92	8.08	8.90	46.10	7.30	...	7.32	8.05	13.09	7.75	7.28	8.71
Cleveland	6.80	8.09	8.85	49.16	7.16	...	7.14	7.85	12.91	7.61	7.16	8.63
Detroit	6.99	8.28	8.78	43.50	7.34	...	7.36	8.04	13.05	7.75	7.27	8.65
Erie, Pa.	6.80	7.90	8.85	....	7.15	...	7.08	7.85	....	7.40	7.15	8.63
Houston	7.85	8.75	10.49	....	8.15	...	8.25	9.85	14.00	8.20	7.80	9.20
Jackson, Miss.	7.10	8.20	9.20	....	7.40	...	7.40	9.44	....	7.60	7.45	9.30
Los Angeles	8.05	10.00	11.00	....	8.35	...	8.05	11.25	14.25	8.30	8.05	10.25
Milwaukee	6.89	8.18	8.59	....	7.15	...	7.17	7.94	12.94	7.45	7.08	8.55
Moline, Ill.	7.15	8.44	8.85	....	7.41	...	7.43	8.10	....	7.63	7.34	...
New York	7.46	8.68	9.44	44.95	8.07	...	7.96	9.48	13.28	7.99	7.76	9.19
Norfolk, Va.	7.25	...	...	....	7.65	...	7.65	9.50	....	7.95	7.45	8.95
Philadelphia	7.14	8.42	9.35	45.98	7.67	9.02	7.64	8.46	13.16	7.74	7.37	8.69**
Pittsburgh	6.80	8.09	9.20	49.00	7.16	...	7.08	7.85	12.85	7.28	6.99	8.46
Portland, Oreg.	7.80	8.80	10.65	....	8.00	...	7.95	12.20	15.00	7.85	7.75	9.60
Richmond, Va.	7.00	...	9.47	....	7.65	...	7.70	8.85	....	7.95	7.20	9.10
St. Louis	7.09	8.38	9.19	43.89	7.35	...	7.37	8.14	13.14	7.68	7.28	8.75
St. Paul	7.46	8.59	9.16	....	7.72	...	7.74	8.51	13.51	7.94	7.65	9.12
San Francisco	8.10	9.65	10.15	51.65	8.35	...	8.05	11.20	14.25[3]	8.25	8.05	10.25
Seattle	8.55	10.40	10.80	54.00	8.65	...	8.35	11.70	14.60	8.30	8.20	10.10
Spokane	8.55	11.00[7]	10.80	....	9.05	...	8.35	11.80	15.35	8.30	8.20	10.60
Washington	7.50	8.79	7.97	....	8.12	...	8.08	9.09	....	8.40	7.68	9.34

Prices do not include gage extras; †prices include gage and coating extras (based on 12.50-cent zinc), except in Birmingham (coating extra excluded); ‡includes 35-cent special bar quality extras; **½-in. and heavier; ††as annealed; §§under ½-in.

Base quantities, 2000 to 4999 lb except as noted; Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb, and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [2]—500 to 9999 lb; [3]—400 to 999 lb; [4]—4000 lb and over; [5]—1000 to 1999 lb; [6]—1000 lb and over; [7]—1500 to 3999 lb; [8]—2000 to 3999 lb; [9]—f.o.b. local delivery in lots of 10,000 lb and over.



Dependable Johnson Bearings Help Give Long Life To Big Cat Machinery

Engine bearings and bearings in track rollers and other components play a big role in the ability of Caterpillar Diesel Tractors to give long, satisfactory performance on tough jobs.

Caterpillar Tractor Co., manufacturers of the big yellow, earth moving rigs you see at every hand, makes certain that each part has the quality and stamina to give trouble-free service.

The ability of Cat equipment to handle difficult assignments depends in part on bearings obtained from Johnson Bronze Company of New Castle, Pa., which supplies a wide variety of the bearings used throughout Caterpillar products.

Dependable Johnson bearings—made of aluminum on steel, babbitt on steel, cast bronze, bronze on steel, and sintered bronze powder (Ledaloyl)—help Caterpillar meet its triple objective of: 1. durability, 2. bigger pay loads, and 3. longer life. Johnson also offers Caterpillar sound engineering help, has a complete line, maintains uniform high quality and consistently meets Caterpillar's specifications.

This is a typical example of the service Johnson gives many manufacturers in all industry by supplying them with many types of bearings for a wide variety of applications—from automobiles to sound recorders—from automatic washers to machine tools—to name but a few.

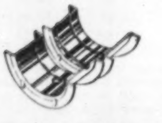
To enjoy the dependability and economy of Johnson bearings in your products, write for information on how Johnson engineers will work with you to make a better product at lower cost. Johnson Bronze Company, 550 S. Mill Street, New Castle, Pennsylvania.

Johnson Bearings

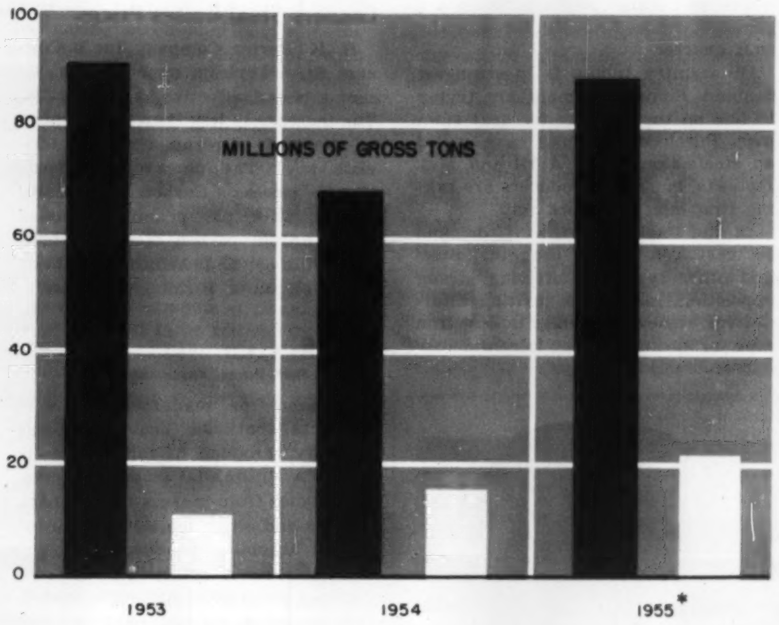
LEDALOYL
(powder metallurgy)

ALUMINUM ON STEEL

BRONZE ON STEEL


STEEL AND BABBITT

CAST BRONZE



Record steel production uses less domestic ore as . . .

Iron Ore Imports Go Up

■ **Lake Superior Iron Ore Consumption**

Lake Superior Iron Ore Association

□ **Iron Ore Imports**

Bureau of Census

* Estimated by STEEL

THE FIGURES tell the story. Ore imports are on the rise; use of Lake Superior iron ore is beginning to slip.

This year, imports will be more than four times what they were in 1947, about double what they were just two years ago.

Consumption Drops—In 1953, when 111.6 million net tons of steel were made, consumption of Lake Superior ore in U. S. furnaces reached 76.6 million gross tons by the end of October. This year, with a record production of 116.3 million tons expected, only 69.5 million tons of Lake Superior ore were used during the same period.

In 1953, nearly 95 million gross tons of ore were brought down the lakes. This year, with nearly 5 million more net tons of steel being produced, ore shipments were slightly over 87 million tons as of last Monday morning. Little more will be shipped. The last cargo of ore for the Pittsburgh Steamship Division, U. S. Steel Corp., cleared the Soo Locks last Monday afternoon.

Imports — In August, 2,870,371 gross tons of ore were brought into the U. S. to set a record.

Imports as of the end of August were 14.4 million tons; almost as much as the 15.8 million tons brought in during recordbreaking 1954.

Canadian shipments (5.5 million tons) are nearly 2 million tons higher than last year's. Venezuelan shipments, 4.9 million tons, are close to last year's total of 5.2 million tons. And shipments from Brazil are way ahead of last year's.

Three countries (Sweden, Chile and Peru) may not ship as much this year as they did last year. Point of interest: Ore prices in these countries have gone up—from 40 to 84 cents a ton.

Prices in the other big exporting countries are less than they were a year ago. Liberian ore costs 76 cents a ton less this year. Its imports will rise by about 165,000 tons. Brazilian ore is 54 cents less, and ore from Venezuela is 49 cents cheaper.

Ore and Scrap—Scrap consumption this year is almost identical with 1953's. For the first nine months this year scrap consumption was about 0.5 per cent less than in 1953, while steel production was up 272,000 net tons. So foreign ore must make up for the drop in the amount of Lake Superior ore available and the small amount needed because of the decreased percentage of scrap used.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 181 & 182

"We can't take another 1-ton order for sheet in the first quarter," says the sales manager for one of the smaller firms in the Pittsburgh district. His remark is true of most producers who say there is no chance for a greater allotment of steel to customers in early 1956. Supply is expected to grow more critical as some producers will block out one month in the first quarter to reduce unfilled orders. In the case of the sales manager mentioned above, his firm will accept no March orders.

While some manufacturers of household appliances are seasonally less active, the fact doesn't lessen their demand for steel. They are striving to build up stocks which are below normal in practically all instances. All will receive far less than they have requested for first quarter, and they are not optimistic as to what they will receive in the second quarter. Conversion tonnage is becoming more prominent, but negotiations are on a limited basis.

Steel Bars . . .

Bar Prices, Page 180

Producers continue to turn away substantial inquiries for hot-rolled carbon steel bars. Carry-overs from this quarter probably will cancel out four to six weeks of production in the first quarter, although producers are making some progress in reducing the order backlog by trimming customer allotments.

Despite their sold-up condition through the first quarter, producers say consumers are still refusing to take "no" for an answer to their inquiries and are pressing hard for additional tonnages.

Predictions of a 10-to-15-percent increase in demand for machinery steel in 1956 are circulating in the Pittsburgh district. Demand for bars from this industry is increasing and is expected to continue to grow through June of next year.

In hot-rolled alloy and cold-finished bars, the situation is different. Notwithstanding improved demand, mills can accept tonnage for fairly early delivery; in January on certain of the larger sizes of plain hot-rolled alloy.

An exception applies to nickel-bearing steel bars and other products where the nickel content runs 0.75

per cent or more. Where ratings apply, producers supply their customers without question once agreement is reached with regard to deliveries. Where ratings don't apply, the mills fight shy, although sometimes allocating a little where the customer is one of many years standing.

Tubular Goods . . .

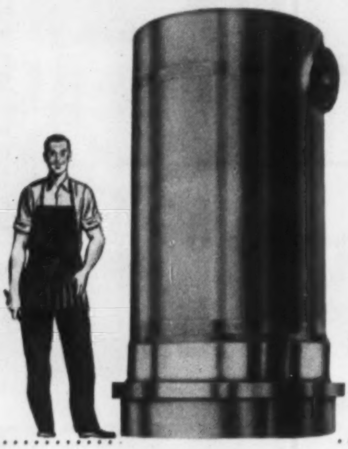
Tubular Goods Prices, Page 184

Pittsburgh—Distributors are placing orders for January merchant pipe shipments; that month will probably see mills operating at capacity. Elsewhere in tubular products, mills are generally booked solidly through the first quarter.

Oil country tubing is in strongest demand. Some customers are trying to line up their supply for next summer. Purchasing agents have called on steelmakers with April and May requests, but most producers are taking first quarter orders only.

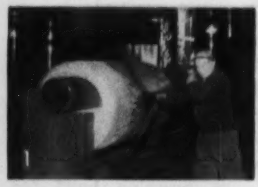
In the Pacific Northwest, demand for cast iron pipe is dragging. Steel and other types are offering strong opposition, many bids inviting alternatives. Renewed interest in cast iron pipe for spring delivery is confidently expected within 30 days.

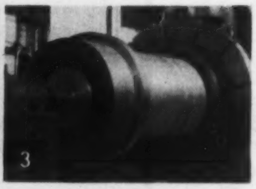
Need Large Hydraulic Cylinders?



BUILT TO REQUIRED SIZES AND TOLERANCES BY

TITUSVILLE FORGE





Hydraulic cylinders combining the advantages of thoroughly hot worked steel and clean automatic welding are being furnished by Titusville. Such cylinders insure the user of better physical characteristics (hollow forged shell and flanged sections together with upset forged top or dome sections), freedom from leakage under pressure because of porosity and the complete elimination of costly repairs or rejections. Fabrication is shown in photos above.

1. Hollow forging for shell section being hot worked on mandrel.
2. Hollow and upset forgings assembled for automatic welding.
3. Complete welded cylinder being rough turned in 80" engine lathe.

Let Titusville Forge build your hydraulic cylinders—to your most exacting requirements.

Struthers Wells

STRUTHERS WELLS CORPORATION
TITUSVILLE FORGE DIVISION
TITUSVILLE, PA.
PLANTS AT TITUSVILLE, PA., and WARREN, PA.
Offices in Principal Cities

Connors Steel Raises Prices

H. K. Porter Company Inc.'s Connors Steel Division upped prices ½-cent a pound, effective as of Nov. 28. The increase is less than the advance in the cost of scrap, company officials say. The new schedule lists these prices: Carbon structural shapes, 5.10c per pound; hot-rolled strip, 4.825c; carbon steel merchant bars, 5.15c; and reinforcing bars, 5.15c, all on a Birmingham base.

Wire . . .

Wire Prices, Pages 182 & 183

Demand for manufacturers wire products continues heavy, assuring capacity production for weeks to come. A substantial amount of pressure comes from makers of fasteners, springs and other specialties required by the automotive industry.

Inquiry for merchant products has declined seasonally, although production is being maintained at a high level for inventory building against heavy ordering by distributors in early spring.

Plates . .

Plate Prices, Page 180

Plate inquiry looms heavier than ever, especially with the railroads endeavoring to boost car buying. Class 1 railroads, faced with severe car shortages, plan to place 87,500 freight cars during the final two months of this year. These are in addition to 57,000 on order by these railroads Nov. 1. This 145,000-car purchase program will require an estimated outlay of $1.25 billion. In addition, railroads plan to reduce their percentage of bad order cars from 4.7 to 4 per cent. Plate requirements will be especially heavy.

Steel plate buyers are forced to turn to warehouses in increasing numbers as mill allotments for first quarter are lean. Plate shortage has held up construction work but not to the extent that scarcity of structural shapes affects these projects.

Within 60 days, plate requirements in the Seattle area will increase sharply as several important tank contracts are pending. Plate shortages are becoming more critical in that area. Two principal suppliers state their allotments have been so reduced they are hard pressed to fill previous commitments. No Japanese plate, which was offered freely in the Pacific Northwest two years ago, is on the market.

A. M. Byers Co., Pittsburgh, reports a growing use of wrought iron plate and pipe for protection of oil well casing at offshore points in the Gulf Coast area. Wrought iron, with its anticorrosive qualities, protects the casing in areas near the waterline where attack is worst.

Stainless Steel . . .

Stainless Steel Prices, Page 184

Pittsburgh—Stainless steel sales managers, returning from talks in Washington, report little possibility of increased allotments of nickel. Supply is expected to be critical through early months of next year, if not beyond. Production of nickel-bearing stainless grades is curtailed by the shortage, but steelmakers are recommending substitution of other alloy grades where possible. Their efforts are partially successful and production rates remain high.

Clad-Steel Plate Prices Rise

Due to an increase in the price of Monel, Lukens Steel Co. advanced base prices of its Monel-clad plate Dec. 1. Under new schedules, 5 per cent cladding is 36.15c; 10 per cent, 43.95c; 15 per cent, 51.75c; 20 per cent, 59.55c; 25 per cent, 69.55c; 30 per cent, 79.55c; 35 per cent, 89.55c; 40 per cent, 99.55c; 45 per cent, $1.0955; 50 per cent, $1.1955.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 180

More winter construction than ever before is keeping the pressure on reinforcing steel products, particularly bars. While the bulk of orders on suppliers' books are for large projects, there is a big volume of small jobs pressing for tonnage. For the most part, they are in the commercial or municipal category. In the latter group are a great number of school buildings.

Prospects for 1956 are highly promising for a large volume of orders.

Structural Shapes . . .

Structural Shape Prices, Page 180

Structural fabricators are still confronted with far more tonnage than they can handle. Whatever seasonal letup there may be is still far from bringing demand into balance with production.

Shop order backlogs are more extended and are still increasing; some are booked ten months ahead. Contributing to this situation is a continued scarcity of plain material. Few, if any, fabricators have enough steel to keep them going at normal capacity. Structural shops are getting tonnages ordered as far back as September. The advanced delivery situation is causing some builders to defer action in coming into the market, pending a further check on likely cost trends and financing requirements. However, considerable work is still under active negotiation.

Prestressed concrete beams (estimated tonnage: 5000 tons) for small bridges are edging out some structural steel tonnage for flood replacements in the Northeast. Most prestressed beams, including reinforcing strand, are bought direct, but several bridges being estimated will be bought by contractors. For short spans, prestressed beams have a price advantage.

Warehouse . . .

Warehouse Prices, Page 185

Warehouse steel business continues brisk and would be even more active if distributors had more tonnage to sell, especially structurals and plate. As mills continue to key their flat-rolled production to automotive requirements, it's still difficult for warehouses to secure sheet and strip.

Distributors are growing extremely short in their supplies and believe first-quarter conditions will be even

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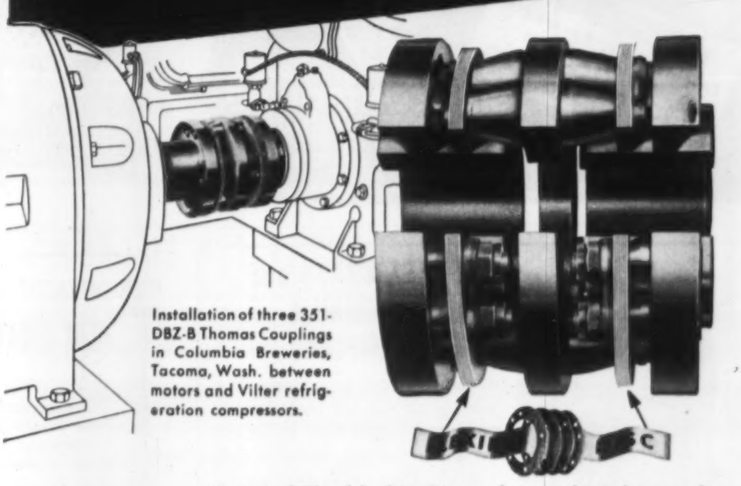
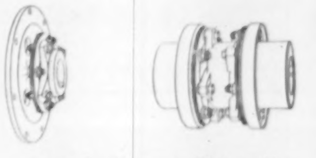


Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES

FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



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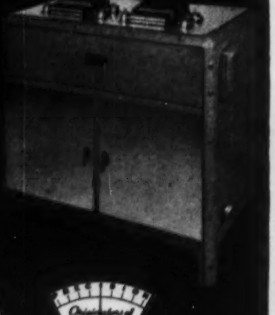

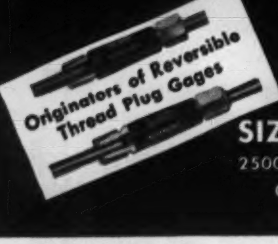

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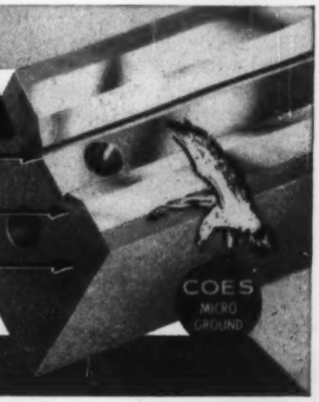


COES KNIFE COMPANY, Worcester, Mass.- Est. 1830

tighter. Current deliveries to distributors are one to two months behind schedule, and carry-overs limit openings for new orders for delivery in the first quarter. An exception is the Los Angeles district where stocks are above normal in some products.

Some increase is noted in imports, which are running around 5000 to 7000 tons monthly at Philadelphia.

Semifinished Steel . . .

Semifinished Prices, Page 180

Wheeling Steel Corp. is maintaining steel production at near-capacity rates at its Steubenville, Mingo Junction, Yorkville, O., and Benwood, W. Va. plants. All six of the company's blast furnaces are operating. Major steel departments operated Thanksgiving Day because of heavy commitments to customers.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3500 tons, tunnel section, Fitzgerald expressway, Boston, to Bethlehem Steel Co., Bethlehem, Pa.; V. Barletta Co., Boston, general contractor; tonnage in addition to tunnel frames and reinforcing to same fabricator.

500 tons, Pennsylvania Railroad bridge, Beaver county Pennsylvania, to American Bridge Division, United States Steel Corp., Pittsburgh.

500 tons, galvanized transmission towers for Bonneville Power Administration, to Bethlehem Pacific Coast Steel Corp., Seattle, low at $154,756, f.o.b. Seattle.

450 tons, structurals and bars, engineering building, Southwestern Louisiana Institute, Lafayette, La., to Mississippi Steel & Iron Co., Jackson, Miss.; R. J. Jones & Sons, Alexandria, La., general contractor; reinforcing, Ceco Steel Products Corp., New Orleans.

325 tons, addition, St. Joseph hospital, Reading, Pa., to Reading Metalcraft Co., that city.

325 tons, structurals and bars, regional high school, Deerfield, Mass., to Haarmann Steel Co., Holyoke, Mass.; O. D. Purington, Providence, R. I., general contractor; reinforcing, Plantations Steel Co., Providence, R. I.

310 tons, structurals and bars, school, Arlington, Mass., to Groisser & Shlager Iron Works, Somerville, Mass.; Vappi & Co. Inc., Cambridge, Mass., general contractor; reinforcing, Concrete Steel Co., Boston.

255 tons, high school, Wallingford, Conn., to Standard Structural Steel Co., Hartford, Conn.; the Wadhams & May Co., Hartford, Conn., general contractor.

190 tons, Locksa river bridge, Idaho, for Forest Reserve, to Gate City Iron Works, Omaha, Nebr.

180 tons, students union building, University of New Hampshire, Durham, N. H., to Groisser & Shlager Iron Works, Somerville, Mass.; J. A. Volpe Construction Co., Malden, Mass., general contractor.

100 tons, state school, Portland, Me., to Bancroft & Martin Rolling Mills Co., South Portland, Me.; Consolidated Constructions Inc., Portland, Me., general contractor.

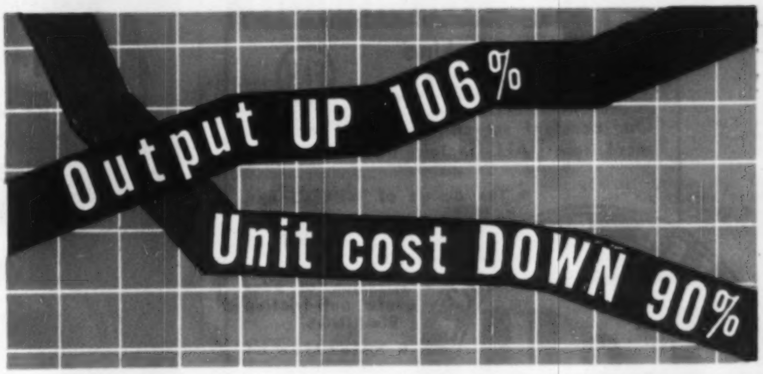
STRUCTURAL STEEL PENDING

8000 tons, Ft. Pitt bridge, Pittsburgh; plans scheduled to be brought out by the state of Pennsylvania in January for bidding.

4355 tons, bridge, North-South freeway, Providence river, Providence, R. I.; bids Dec. 14, state, Division of Purchases, Providence; also 1260 tons, reinforcing, and 89,178 linear ft foundation piles.

1000 tons or more, hangar and preflight facilities, Larson Field, Washington state; Boeing Airplane Co., bid call for Dec. 23

(*Please turn to page* 194)



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- **Run test for client before delivery**

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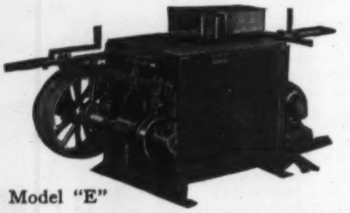

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Current Ferroalloy Quotations

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $90.50; 19-21% Mn, 1-3% Si, $88; 16-19% Mn, $86.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $190, Clairton, Duquesne, Johnstown and Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, Philo, O.; Sheffield, Ala.; Portland, Oreg., and Tacoma, Wash. Add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%). Lump $198 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 76%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 29.95c per lb of contained Mn, carload packed 30.7c, ton lots 31.8c, less ton 33c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk 21.85c per lb of contained Mn, packed, carload 22.9c, ton lot 24.5c, less ton 25.7c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 30c; 2000 lb to min carload, 32c; 250 lb to 1999 lb 34c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 11.2c per lb of alloy. Packed, c.l. 12.2c, ton 12.65c, less ton 13.65c, f.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37 f.o.b. Niagara Falls, N.Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 26.25c per lb of contained Cr; c.l. packed 27.5c, ton lot 29.25c, less ton 30.65c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 31.75c per lb contained Cr, 0.02 max 38.50c, 0.03% max 38c, 0.06% max 36.50c, 0.1% max 36c, 0.15% max 35.75c, 0.2% max 35.50c, 0.5% max 35.25c, 1.0% max 34c, 1.5% max 33.85c, 2.0% max 33.75c. Ton lot, add 3.1c, less ton add 4.8. Carload packed add 1.45c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l. 8 M x D, bulk 27.4c per lb contained Cr. Packed c.l. 28.7c, ton 30.5c, less ton 32c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed 8 M x D, 19.6c per lb of alloy, ton lot 20.85c; less ton lot, 22.05c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 39.05c per lb of contained Cr; 1" x down, bulk 39.8c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.2% min, Fe 0.2 max). Contract, carlot, packed 2" x D plate (about ⅛" thick) $1.25 per lb, ton lots $1.27, less ton lots $1.28. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.10 per lb of contained V. Delivered. Spot, add 10c. **Special Grade** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.20. **High Speed Grade** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.30.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots, packed, $1.33 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 11.75c per lb of contained Si. Packed, c.l. 13.85c, ton lot 15.3c, less ton 16.95c. F.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.2c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 14.5c per pound contained silicon. Packed, c.l. 16.2c, ton lots, 18c; less ton, 19.35c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 15.4c per lb of contained Si. Packed c.l. 17.05c, ton lot 18.7c, less ton 19.95c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 18.5c per lb of contained Si. Packed, c.l. 19.95c, ton lot 21.35c, less ton 22.4c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 98% Si, 0.75% max Fe, 0.07 max Ca). C.l. lump, bulk, 20.5c per lb of Si. Packed, c.l. 21.95c, ton lot 23.25c, less ton 24.25c. Add 0.5c for max 0.03 Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx, 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lots packed 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 8.5c, per lb of alloy. Packed, c.l. 9.5c, ton lot 10.65c, less ton 11.5c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 26.25c per lb of alloy, ton lot 27.4c, less ton 28.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D. $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5%-1.9%)..Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carloads 9.50c per lb. f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 22c per lb of alloy, carload packed 23.05c, ton lot 24.95c, less ton 25.95c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 21.5c per lb of alloy, carload packed 22.95c, ton lot 25.25c, less ton 26.75c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3⅜ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.95 per lb of briquet, carload packed in box pallets 17.15c, in bags 17.85c; 3000 lb to c.l. in box pallets 18.35c; 2000 lb to c.l. in bags, 19.05c; less than 2000 lb in bags 19.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 12.1c per lb of briquet, c.l. packed, pallets 12.3c, bags 13.1c; 3000 lb to c.l., pallets 13.5; 2000 lb to c.l., bags, 14.3c, less ton 15.2c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.7c per lb of briquet, c.l. packed, pallets, 12.9c; bags 13.7c, 3000 lb to c.l., pallets, 14.1c; 2000 lb to c.l., bags, 14.9c; less ton 15.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract carload, bulk 6.75c per lb of briquet; packed, pallets, 6.95c; bags, 7.75c; 3000 lb to c.l., pallets, 8.55c; 2000 lb to c.l. bags 9.35c; less ton 10.25c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2¼ lb and containing exactly 1 lb of Si). Carload, bulk 6.9c. Packed, pallets 7.1c; bags 7.9c; 3000 lb to c.l. pallets 8.7c; 2000 to c.l. bags 9.5c; less ton 10.4c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.45 per lb of contained W; 2000 lb W to 5000 lb W, $3.55; less than 2000 lb W, $3.67. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.90 per lb of contained Cb. Delivered. Spot add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min C 0.30% max). Ton lots, 2" x D, $4.65 per lb of contained Cb plus Ta, delivered; less ton lots $4.70.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.) Contract, c.l. packed ½" x 12 M, 18.5c per lb of alloy, ton lots 19.65c, less ton 20.9c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18.5c per lb of alloy, ton lots 19.65c; less ton lots 20.9c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17.19%, Mn 8-11%). C.l. packed 17.2c per lb or alloy; ton lots 18.7c; less ton lots 19.95c, f.o.b. Niagara Falls; freight allowed to St. Louis.

Siminal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 16.50c. Packed c.l. 17.50c, 2000 lb to c.l. 18.50c, less than 2000 lb 19c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb containers, f.o.b. Langeloth, Pa., $1.46 in all sizes except powdered which is $1.57; Washington, Pa., furnace, any quantity $1.46.

Technical Molybdic-Oxide: Per lb contained Mo, f.o.b. Langeloth, Pa.; $1.25 in cans; in bags, $1.24, f.o.b. Langeloth, Pa.; $1.24, Washington, Pa.

(*Concluded from page* 191)

postponed; new date unstated, probably in January.

1000 tons, five hangars and other construction, Elmendorf Air Base, Alaska; bids to U. S. Engineer, Anchorage, Alaska, Dec. 14.

980 tons, state bridge, Berks county, Pennsylvania; bids Dec. 22.

565 tons, including 335 tons, wide flange, navy, General Stores Supply Office, Philadelphia; bids Dec. 5.

330 tons, state bridge, Philadelphia county, Pennsylvania; bids Dec. 16.

300 tons, tees, grade M, Navy, General Stores Supply Office, Philadelphia.

300 tons, pumping plant addition and other construction, Hanford Works; Morrison-Knudsen Co. Inc., Seattle, low at $1,869,500.

230 tons three-span continuous WF beam bridge, Ferrisburg, Vt.; bids Dec. 16, Montpelier, Vt.

200 tons, Army bulk supply warehouse, Ladd Air Base, Alaska; S. S. Mullen Inc., Seattle, low and awarded at $1,357,000.

167 tons, state bridge work, Union and Somerset counties, New Jersey; bids Dec. 13; also 180 tons of reinforcing steel.

120 tons, two-span steel bridge, Goffstown branch, Boston & Maine Railroad, Manchester, N. H.; bids Dec. 8, Concord, N. H.

100 tons, angles, Raritan arsenal, Metuchen, N. J.; bids Dec. 9.

REINFORCING BARS . . .

REINFORCING BARS PLACED

615 tons, Morrison street bridge piers, Portland, Oreg., to Soule Steel Co., Portland; Manson Construction & Engineering Co., Seattle, general contractor.

535 tons, Washington state bridge, Capitol Lake, to Bethlehem Pacific Coast Steel Corp., Seattle; MacRae Bros., Seattle, low at $425,469, general contractor.

350 tons, science building, Louisiana Polytechnic Institute, Ruston, La., to Contractors Material Co. Inc., Jackson, Miss.; G. E. Bass & Co., Jackson, general contractor.

280 tons, building, state hospital, Monson, Mass., to Joseph T. Ryerson & Son Inc., Boston; L. & R. Construction Co., Medford, Mass., general contractor.

240 tons, Idaho state bridge, Priest river, to Bethlehem Pacific Coast Steel Corp., Seattle.

190 tons, student union building, University of New Hampshire, Durham, N. H., to Joseph T. Ryerson & Son Inc., Boston; J. A. Volpe Construction Co., Malden, Mass., general contractor.

170 tons, high school, Wallingford, Conn., to Scherer Steel Co., Hartford, Conn.; the Wadhams & May Co., Hartford, general contractor.

REINFORCING BARS PENDING

850 tons, state bridge, Philadelphia county, Pennsylvania; bids Dec. 16.

200 tons, state bridge work, Berks county, Pennsylvania; bids Dec. 22.

180 tons, state bridge work, Union and Somerset counties, New Jersey, bids Dec. 13; also 167 tons of structural steel.

109 tons, flume construction, Selah Irrigation District, Naches, Wash.; Cherf Bros. & Sandkey, Ephrata, Wash., low at $97,629.

PLATES . . .

PLATES PENDING

950 tons, three bulk storage tanks, 25,000-bbl each, King Salmon, Alaska; bids opened in September; no award yet by U. S. Engineer.

135 tons, elevated steel water tank, New Town No. 1, St. Lawrence power project; bids Dec. 6, Toronto, Canada.

100 tons (mostly ¼-in.), Letterkenny Ordnance Depot, Chambersburg, Pa.; bids Dec. 7.

PIPE . . .

CAST IRON PIPE PLACED

102 tons, Salem, Oreg., system expansion, to U. S. Pipe & Foundry Co., Seattle.

90 tons, 1558 ft of 20 in., Seattle district installation, to Pacific States Cast Iron Pipe Co., Seattle.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Canadian National, 35 diesel units, to General Motors Diesel Ltd., Hamilton, Ont.

LOCOMOTIVES PENDING

Northern Pacific, 79 diesel locomotive units; contemplated.

RAILROAD CARS PLACED

Clinchfield, 50 seventy-ton covered hopper cars and 10 loader-equipped boxcars, to Pullman-Standard Car Mfg. Co., Chicago.

Denver & Rio Grande Western, 100 fifty-ton boxcars and 100 fifty-ton flatcars to ACF Industries Inc., New York, and 25 seventy-ton covered hopper cars to Pullman-Standard Car Mfg. Co., Chicago.

Minneapolis, Northfield & Southern, two fifty-ton boxcars to Pullman-Standard Car Mfg. Co., Chicago.

Missouri Pacific, 1500 fifty-ton boxcars, to own shops, De Soto, Mo.

Reading, 400 fifty-ton boxcars to ACF Industries Inc., New York; in addition to these and 500 gondolas and 500 hoppers recently placed with Bethlehem Steel Co., Bethlehem, Pa., the railroad is now inquiring for 1900 freight cars.

St. Louis-San Francisco, 2000 freight cars, 1700 to the Pullman-Standard Car Mfg. Co., Chicago, and the remainder to the railroad's own shops.

Union Pacific, 2000 freight cars to company shops. List comprises 1300 fifty-ton boxcars of various types, 4000 seventy-ton covered hopper cars and 300 seventy-ton flatcars.

Wabash, 100 seventy-ton covered hopper cars to Pullman-Standard Car Mfg. Co., Chicago.

Western Maryland, 300 seventy-ton coal hopper cars, to Bethlehem Steel Co., Bethlehem, Pa., and 50 fifty-ton flatcars to the Greenville Steel Car Co., Greenville, Pa.

RAILROAD CARS PENDING

Reading, 1900 freight cars, comprising 1500 hopper cars and 400 gondolas; bids asked; these are in addition to 1400 placed recently.

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Ores

Lake Superior Iron Ore

(Prices effective for the 1955 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports)

Old range bessemer	$10.40
Old range nonbessemer	10.25
Mesabi bessemer	10.25
Mesabi nonbessemer	10.10
Open-hearth lump	11.25
High phosphorus	10.00

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60-68%	20.00
N. African hematite (spot)...nom.	18.00-20.00
Brazilian iron ore, 68-69% (spot)	24.00-26.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$30.00-$31.00
Domestic, scheelite, mine	63.00

Manganese Ore

Mn 48%, nearby, 95c-$1.05 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; 46-47%, 75c-80c.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and African

48% 2.8:1 ...nom.	$45.00-$50.00
48% 3:1	42.00-44.00
48% no ratio	34.00

South African Transvaal

44% no ratio	$19.00-$20.00
48% no ratio	32.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

55-60%	$3.60-$3.85
60-65%	3.85-4.00

Vanadium Ore

Cents per lb V_2O_5 content, deld. mills

Domestic	31.00

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $122; Salina, Pa., $127; Niles, O., $133.

Super-Duty: St. Louis, $150.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., Hawston, Pa., $128; Warren, Niles, O., Hays, Pa., $133; Morrisville, Pa., $131.50; E. Chicago, Ind. Joliet, Rockdale, Ill., $138; Lehigh, Utah, $144; Los Angeles, $151.

Super Duty. Hays, Sproul, Hawston, Pa., Warren, Windham, O., Athens, Tex., $145; Morrisville, Pa., Niles, O., $148; Joliet, Ill., $151; Curtner, Calif., $163.

Semisilica Brick (per 1000)

Clearfield, Pa., $139; Philadelphia, $124; Woodbridge, N. J., $122.

Insulating Fire Brick (per 1000)

2300° *F:* Massillon, O., $178.50; Clearfield, Pa., $213, Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $206; Vandalia, Mo., $214.10; Portsmouth, O., $207.50; Bessemer, Ala., $212.80.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Mexico, Mo., $88.50; Wellsville, O., $92.50; Clearfield, Pa., Portsmouth, O. $98.

High-Alumina Brick (per 1000)

50 Per Cent: Clearfield, Pa., St. Louis, Mexico, Mo., $194; Danville, Ill., $197; Philadelphia, $201

60 Per Cert: St. Louis, Mexico, Vandalia, Mo., Clearfield, Pa , $241; Danville, Ill., $244; Philadelphia, $248.

70 Per Cent: St. Louis, Mexico, Vandalia, Mo., $279; Danville, Ill., $281; Clearfield, Pa., Philadelphia, $286.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $157; Clearfield, Pa., $158.50; St. Louis, $169.30.

Nozzles (per 1000)

Reesdale, Pa., $253.70; Johnstown, Pa. $259.20, Clearfield, Pa., $259 40; St. Louis, $259 45: Bridgeburg, Pa., $286.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $196; Clearfield, Pa., $198; St. Louis, $195.80.

Dolomite (per net ton)

Domestic, dead-burred bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Narlo, O., $15; Thornton, McCook, Ill., $15.60; Dolly Siding, Bonne Terre, Mo., $14.

Magnesite (per net ton)

Domestic, dead-burned, bulk, ½-in. grains with fines: Chewelah, Wash., $40; Luning, Nev., $40. ⅝-in. grains with fines: Baltimore, $66.40.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$13.25-$14.00
Connellsville, foundry	16.00-17.00

Oven Foundry Coke

Kearny, N. J., ovens	$25.50
Camden, N. J., ovens	25.00
Everett Mass., ovens	
New England, deld.	*27.05
Chicago, ovens	25.75
Chicago, deld.	27.25
Terre Haute, Ind., ovens	25.50
Milwaukee ovens	26.25
Indianapolis, ovens	25.50
Portsmouth, O., ovens	24.75
Cincinnati, deld.	27.34
Painesville, O., ovens	26.25
Cleveland, deld.	28.18
Birmingham, ovens	24.40
Cincinnati deld.	29.33
Buffalo, ovens	25.75
Buffalo, deld.	27.00
Lone Star, Tex., ovens	19.50
Neville Island, Pa., ovens	25.00
Philadelphia, ovens	25.00
Swedeland, Pa., ovens	25.00
St. Paul, ovens	25.00
Detroit, ovens	26.25
Detroit, deld.	27.25
Pontiac, deld.	27.81
Saginaw, deld.	29.33

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*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulphate	$42-$45
Birmingham area	42.00†

---

†With port equalization against imports.

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-$39; 70%, $35-$36; 60%, $31-$32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $25.50.

Electrodes

Threaded with nipple, unboxed, f.o.b. plant

Inches — Diam	Inches — Length	Per 100 lb
	GRAPHITE	
2	24	$52.50
2½	30	33.75
3	40	32.00
4	40	30.25
5½	40	30.00
6	60	27.25
7	60	26.75
8, 9, 10	60	24.25
12	72	27.25
14	60	23.50
16	72	22.50
17	60	23.00
18	72	22.50
20	72	22.25
	CARBON	
8	60	12.10
10	60	11.80
12	60	11.75
14	60	11.70
14	72	10.85
17	60	10.75
17	72	10.35
20	84	10.30
20	90	10.10
24	72, 84	10.30
24	96	10.05
30	84	10.20
40, 35	110	9.90
40	100	9.90

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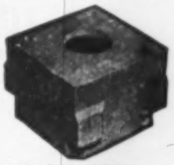

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Scrap . . .

Scrap Prices, Page 198

Chicago—The upward pressure in steelmaking scrap continues. Several major items have advanced another $1 a ton to make the second jump in two weeks. Involved are No. 1 and 2 heavy melting, No. 1 factory bundles, No. 1 dealer bundles, No. 1 railroad heavy melting, rerolling rails and electric furnace grades.

So far, blast furnace grades have failed to strengthen, and only slight upward adjustments are evident in foundry grades.

Subfreezing weather and snow in the Midwest are hampering collection and movement of scrap. This should prove to be a bullish factor. Ingot production is close to full capacity and future schedules aim to keep it so, thus giving assurance of heavy demand for scrap.

Cleveland — Scrap prices jumped sharply higher here last week. Mainly reflecting a purchase in the Valley by one of the major mills, steelmaking grades here rose to $49-$50. In addition to this movement, scrap from local factory operations, including Fisher Body, brought prices in excess of quoted levels.

Youngstown—The iron and steel scrap market here is displaying a strong undertone, with prices of top-grade material moving higher. There was a decided absence of buying on the part of the large scrap consumers until midweek. Holders of scrap seem determined to hang on for more than early offering prices. Normally, this is the season when the big Valley producers would be accumulating scrap for winter inventories; this year, their inventories are large, as are those of the major scrap suppliers.

One feature that is affecting the Youngstown scrap market is the lowered rate of bessemer steel operations, coupled with the high quality Labrador-Quebec ore that is coming into this district. Mills which normally charge 50-50 hot metal and scrap into their open hearths are charging up to 55 per cent hot metal, 10 per cent cold pig and 35 per cent scrap. Mills also are receiving a large tonnage of scrap in reciprocal deals with their customers.

New York—Reflecting continued strong demand, scrap brokers have advanced their buying prices on practically all grades. The market: $43-$44 on No. 1 heavy melting and No. 1 bundles; $38-$39, No. 2 heavy melting; $33-$34, No. 2 bundles; $22-$23, machine shop turnings; $23-$24, mixed borings and turnings; $25-$26, short shovel turnings; $44-$45, low phos structurals and plate.

Brokers have increased buying prices on No. 1 cupola to $38-$39, on heavy breakable to $41-$42. In stainless steel, 18-8 sheets, clips and solids are higher at $300-$310.

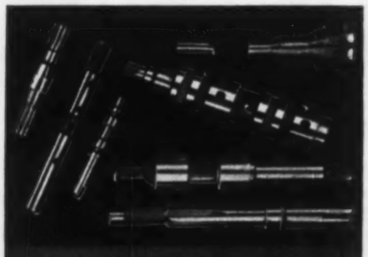
Pittsburgh—Dullness in the market for heavy melting steel continues. Even the customary rumors about impending purchases have fallen off. Mills are using a higher percentage of pig iron in their mix to offset the high scrap cost. Activity in surrounding areas continues brisk, maintaining prices on steelmaking grades at present levels.

Scarcity of 18-8 stainless steel grades leads to much scrambling among users, with prices ranging from $325 to $340 a ton for bundles and solids.

Philadelphia—Further increases in cast material feature the scrap market here. No. 1 cupola is higher at $46-$47, delivered; malleable, $61.50; heavy breakable cast, $49; and drop broken machinery, $53.50-$54. The increase in heavy breakable amounts to $2 a ton.

In the steel grades, machine shop turnings and mixed borings and turnings are higher at $31-$32, delivered; short shovel turnings, $34; and heavy

(*Please turn to page* 200)



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CINTI

Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Nov. 30	$47.00
Nov. 23	46.33
Oct. Avg.	45.17
Nov. 1954	33.33
Nov. 1950	41.33

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*46.00-47.00*
No. 2 heavy melting	*41.00-42.00*
No. 1 bundles	*46.00-47.00*
No. 2 bundles	*37.00-38.00*
No. 1 busheling	*46.00-47.00*
Machine shop turnings	30.00-31.00
Mixed borings, turnings	30.00-31.00
Short shovel turnings	33.00-34.00
Cast iron borings	33.00-34.00
Cut structurals, 3 ft lengths	49.00-50.00
Heavy turnings	42.00-43.00
Punchings & plate scrap	49.00-50.00
Electric furnace bundles	48.00-49.00

Cast Iron Grades

No. 1 cupola	42.00-43.00
Charging box cast	42.00-43.00
Heavy breakable cast	42.00-43.00
Unstripped motor blocks	30.00-31.00
No. 1 machinery cast	*52.00-53.00*

Railroad Scrap

No. 1 R.R. heavy melt.	49.00-50.00
Rails, 2 ft and under	60.00-61.00
Rails, 18 in. and under	61.00-62.00
Rails, random lengths	56.00-57.00
Railroad specialties	54.00-55.00

Stainless Steel Scrap

18-8 bundles & solids	*325.00-340.00*
18-8 turnings	*210.00-220.00*
430 bundles & solids	100.00-110.00
430 turnings	60.00-65.00

CLEVELAND

No. 1 heavy melting	*49.00-50.00*
No. 2 heavy melting	40.00-41.00
No. 1 bundles	*49.00-50.00*
No. 2 bundles	35.00-36.00
No. 1 busheling	*49.00-50.00*
Machine shop turnings	*25.00-26.00*
Mixed borings, turnings	*29.00-30.00*
Short shovel turnings	*29.00-30.00*
Cast iron borings	*29.00-30.00*
Low phos.	*49.00-50.00*
Cut structural plates 2 ft and under	*52.00-53.00*
Alloy free, short shovel turnings	*34.00-35.00*
Electric furnace bundles	*49.00-50.00*

Cast Iron Grades

No. 1 cupola	*49.00-50.00*
Charging box cast	*42.00-43.00*
Stove plate	*47.00-48.00*
Heavy breakable cast	*38.00-39.00*
Unstripped motor blocks	*30.00-31.00*
Brake shoes	*36.00-37.00*
Clean auto cast	*49.00-50.00*
Burnt cast	*38.00-39.00*
Drop broken machinery	*51.00-52.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*49.00-50.00*
R.R. malleable	*54.00-55.00*
Rails, 2 ft and under	*63.00-64.00*
Rails, 18 in. and under	*64.00-65.00*
Rails, random lengths	*59.00-60.00*
Cast steel	*51.00-52.00*
Railroad specialties	*55.00-56.00*
Uncut tires	*51.00-52.00*
Angles, splice bars	*59.00-60.00*
Rails, rerolling	*64.00-65.00*

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	*320.00-330.00*
18-8 turnings	*190.00-200.00*
430 clips, bundles, solids	90.00-100.00
430 turnings	40.00-50.00

YOUNGSTOWN

No. 1 heavy melting	*52.00-53.00*
No. 2 heavy melting	*40.00-41.00*
No. 1 bundles	*52.00-53.00*
No. 2 bundles	*36.00-37.00*
No. 1 busheling	*52.00-53.00*
Machine shop turnings	*29.00-30.00*
Short shovel turnings	*34.00-35.00*
Cast iron borings	29.00-30.00
Low phos.	*52.00-53.00*
Electric furnace bundles	47.50-48.50

Railroad Scrap

No. 1 R.R. heavy melt.	*52.00-53.00*

CHICAGO

No. 1 heavy melting	*45.00-48.00*
No. 2 heavy melting	*36.00-37.00*
No. 1 factory bundles	*48.00-49.00*
No. 1 dealer bundles	*44.00-45.00*
No. 2 bundles	*35.00-36.00*
No. 1 busheling	*45.00-48.00*
Machine shop turnings	27.00-28.00
Mixed borings, turnings	29.00-30.00
Short shovel turnings	29.00-30.00
Cast iron borings	29.00-30.00
Cut structurals, 3 ft	*50.00-51.00*
Punchings & plate scrap	*51.00-52.00*

Cast Iron Grades

No. 1 cupola	*49.00-50.00*
Stove plate	*40.00-41.00*
Unstripped motor blocks	*37.00-38.00*
Clean auto cast	*53.00-54.00*
Drop broken machinery	*53.00-54.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*50.00-51.00*
R.R. malleable	*58.00-59.00*
Rails, 2 ft and under	*63.00-64.00*
Rails, 18 in. and under	*64.00-65.00*
Angles, splice bars	*60.00-61.00*
Rails, rerolling	*69.00-70.00*

Stainless Steel Scrap

18-8 bundles & solids	320.00-335.00
18-8 turnings	225.00-235.00
430 bundles & solids	100.00-105.00
430 turnings	45.00-50.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*41.00*
No. 2 heavy melting	*32.00*
No. 1 bundles	*41.00*
No. 2 bundles	*29.00*
No. 1 busheling	*41.00*
Machine shop turnings	21.00
Mixed borings, turnings	22.00
Short shovel turnings	24.00
Punchings & plate scrap	*50.00*

Cast Iron Grades

No. 1 cupola	*42.00*
Charging box cast	*36.00*
Stove plate	*34.00*
Heavy breakable	*35.00*
Unstripped motor blocks	22.00
Clean auto cast	*45.00*
Malleable	*36.00*

BIRMINGHAM

No. 1 heavy melting	40.00-41.00
No. 2 heavy melting	35.00-36.00
No. 1 bundles	38.00-39.00
No. 2 bundles	28.00-29.00
No. 1 busheling	38.00-39.00
Cast iron borings	17.00-18.00
Short shovel turnings	28.00-29.00
Machine shop turnings	27.00-28.00
Electric furnace bundles	46.00-47.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	47.50-48.00
Stove plate	44.50-45.50
Bar crops and plate	49.00-50.00
Structural plate, 2 ft	48.00-49.00
Unstripped motor blocks	36.00-37.00
Charging box cast	30.00-31.00
No. 1 wheels	38.00-39.00

Railroad Scrap

No. 1 R.R. heavy melt	46.00-47.00
Rails, 18-in. and under	59.00-60.00
Rails, rerolling	60.00-61.00
Rails, random lengths	53.00-54.00
Angles, splice bars	55.00-56.00

PHILADELPHIA

No. 1 heavy melting	48.00
No. 2 heavy melting	43.00
No. 1 bundles	48.00
No. 2 bundles	38.00
No. 1 busheling	48.00
Electric furnace bundles	49.00†
Machine shop turnings	*31.00-32.00*
Mixed borings, turnings	*31.00-32.00*
Short shovel turnings	*34.00*
Heavy turnings	*44.00*
Structurals, & plate	*51.00*
Couplers, springs, wheels	53.00
Rail crops, 2 ft & under	59.00-60.00

Cast Iron Grades

No. 1 cupola	*46.00-47.00*
Malleable	*61.50*
Heavy breakable cast	*49.00*
Drop broken machinery	*53.50-54.00*

†Nominal.

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*43.00-44.00*
No. 2 heavy melting	*38.00-39.00*
No. 1 bundles	*43.00-44.00*
No. 2 bundles	*33.00-34.00*
Machine shop turnings	*22.00-23.00*
Mixed borings, turnings	*23.00-24.00*
Short shovel turnings	*25.00-26.00*
Low phos. (structural & plate)	*44.00-45.00*

Cast Iron Grades

No. 1 cupola	*38.00-39.00*
Unstripped motor blocks	25.00-26.00
Heavy breakable	*41.00-42.00*

Stainless Steel

18-8 sheets, clips, solids	*300.00-310.00*
18-8 borings, turnings	150.00-160.00
430 sheets, clips, solids	120.00-125.00
410 sheets, clips, solids	100.00-105.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*39.00-40.00*
No. 2 heavy melting	33.00-35.50
No. 1 bundles	*38.00-39.50*
No. 2 bundles	28.00-28.50
Machine shop turnings	21.00-21.50
Mixed borings, turnings	23.00-23.50
Short shovel turnings	24.00-24.50
No. 1 cast	36.00-36.50
Mixed cupola cast	34.00-34.50
No. 1 machinery cast	39.00-39.50

BUFFALO

No. 1 heavy melting	43.00-44.00
No. 2 heavy melting	37.00-38.00
No. 1 bundles	43.00-44.00
No. 2 bundles	32.00-33.00
No. 1 busheling	43.00-44.00
Mixed borings, turnings	29.00-30.00
Machine shop turnings	27.00-28.00
Short shovel turnings	30.00-31.00
Cast iron borings	30.00-31.00
Low phos.	*46.00-47.00*

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	40.00-41.00
No. 1 machinery	43.00-44.00

Railroad Scrap

Rails, random lengths	*53.00-54.00*
Rails, 3 ft and under	*55.00-56.00*
Railroad specialties	*45.00-46.00*

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	41.00-42.00
No. 2 heavy melting	35.00-36.00
No. 1 bundles	41.00-42.00
No. 2 bundles	32.00-33.00
No. 1 busheling	41.00-42.00
Machine shop turnings	25.50-26.50
Mixed borings turnings	24.75-25.75
Short shovel turnings	28.00-29.00
Cast iron borings	24.75-25.75
Low phos., 18 in.	50.00-51.00

Cast Iron Grades

No. 1 cupola	43.50-44.50
Heavy breakable cast	41.00-42.00
Charging box cast	41.00-42.00
Drop broken machinery	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	44.00-45.00
Rails, 18 in. and under	60.00-61.00
Rails, random lengths	53.00-54.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*41.50*
No. 2 heavy melting	*39.00*
No. 1 bundles	*41.50*
No. 2 bundles	*35.00*
Machine shop turnings	28.00
Short shovel turnings	28.00

Cast Iron Grades

No. 1 cupola	46.50
Charging box cast	*40.00*
Heavy breakable cast	*40.00*
Unstripped motor blocks	*40.00*
Brake shoes	*39.00*
Clean auto cast	47.00
Stove plate	40.00

Railroad Scrap

No. 1 R.R. heavy melt.	*50.00*
Rails, 18 in. and under	*65.50*
Rails, random lengths	*59.50*
Rails, rerolling	*65.75*
Angles, splice bars	*59.00*

SEATTLE

No. 1 heavy melting	44.00
No. 2 heavy melting	40.00
No. 1 bundles	39.50
No. 2 bundles	34.00
No. 3 bundles	19.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Short shovel turnings	15.00-16.00
Electric furnace, No. 1	50.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	43.00
Heavy breakable cast	38.00
No. 1 wheels	35.00
Unstripped motor blocks	29.00
Clean motor blocks	40.00
Stove plate (f.o.b. plant)	30.00
Brake shoes	35.00

Railroad Scrap

Rails, random lengths	33.00

LOS ANGELES

No. 1 heavy melting	39.00
No. 2 heavy melting	37.00
No. 1 bundles	39.00
No. 2 bundles	35.00
Machine shop turnings	12.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	43.00-45.00

SAN FRANCISCO

No. 1 heavy melting	39.00
No. 2 heavy melting	37.00
No. 1 bundles	39.00
No. 2 bundles	33.00
No. 1 busheling	39.00
Machine shop turnings	18.00
Mixed borings, turnings	18.00
Short shovel turnings	20.00
Cast iron borings	18.00
Cut structurals	41.00
Heavy turnings	20.00
Punchings & plate scrap	39.00

Cast Iron Grades

No. 1 cupola	*50.00*
Charging box cast	35.00
Stove plate	39.00
Heavy breakable cast	36.00
Unstripped motor blocks	32.00
Brake shoes	35.00
Clean auto cast	45.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	48.00

HAMILTON, ONT.

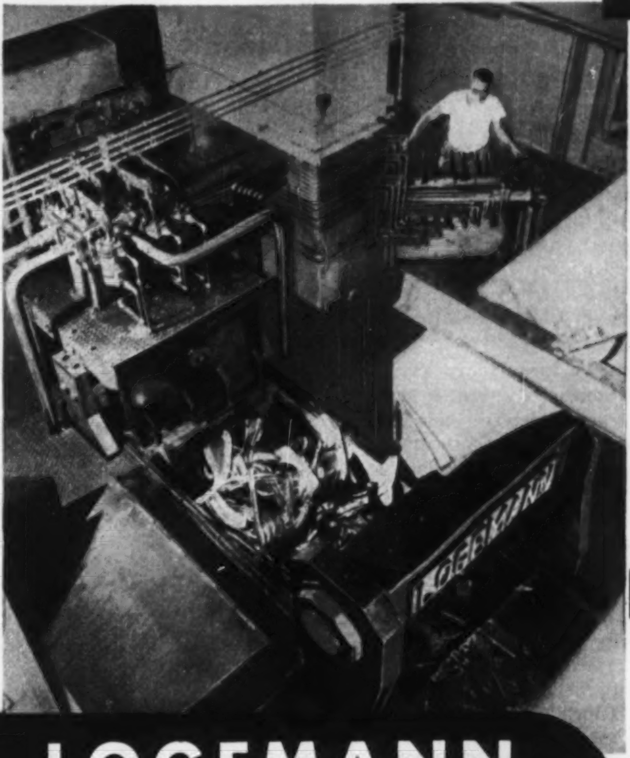
No. 1 heavy melting	38.50
No. 2 heavy melting	35.50
No. 1 bundles	38.50
No. 2 bundles	32.50
Mixed steel scrap	32.50
Mixed borings, turnings	17.00
Rails, remelting	47.50
Busheling, new factory: Prepared	36.50
Busheling, new factory: Unprepared	32.50
Short steel turnings	21.00

Cast Iron Grades†

No. 1 machinery cast	42.00-45.00

†F.o.b., shipping point.

LOGEMANN



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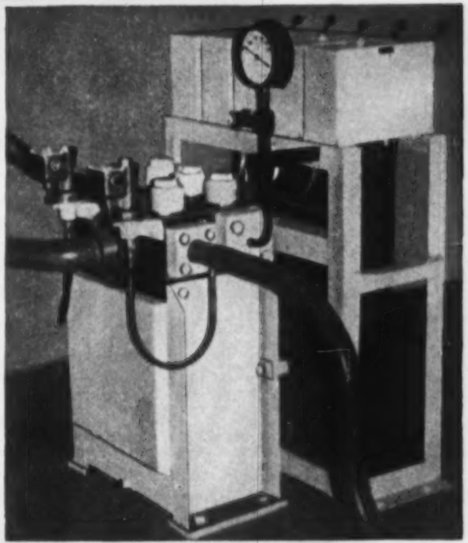
. . . powerful . . . compact . . . capable of high tonnage output!

In the large stamping plants and rolling mills where it is critically important that trim and stamping skeletons are quickly disposed of to avoid interference with production, LOGEMANN metal balers are relied on to keep ahead of production and pack such scrap into high density, self-cohering bricks for re-melting.

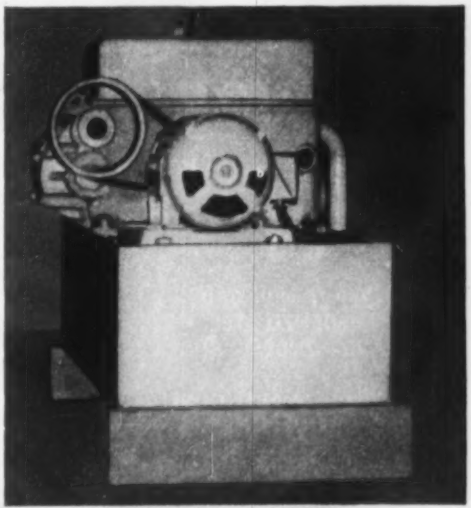
Hundreds of installations have established new records for tonnage, minimum maintenance, reliability, over extended periods of uninterrupted operation at high-speed.

LOGEMANN models are not confined to the large sizes. Many small plants have found it profitable to use smaller sizes embodying the same features of reliability, at minimum operating cost. Interested parties are invited to write for details. Information as to the character of the scrap, tonnage to be handled in a given period of hours, and range of gauges is helpful in determining the proper model.



HYDRAULIC VALVES

The illustration shows a close-coupled hydraulic valve, operated by compressed-air cylinders for high-speed distribution of large gallonage of fluid at high pressure. LOGEMANN engineers have designed and built valves for many unusual as well as standard applications, and will welcome inquiries, with an outline of the conditions and requirements.



HYDRAULIC PUMPS

The opposed-cylinder close-coupled double pressure pump shown in the illustration is mounted on an individual tank to conserve floor space under present crowded plant and operating conditions. When requesting details, please indicate the nature of the service, pressure and gallonage requirements, and the fluid to be handled.

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(Concluded from page 197)

turnings, $44. Structurals and plate have strengthened to a flat $51, delivered. No change is noted in the major open-hearth grades which may hold close to current levels for a while.

Buffalo—Movement of scrap in this area dropped sharply last week. A heavy snow fall closed dealers' yards in sections hardest hit. Meanwhile, buying interest is supporting prices at unchanged levels. The storm virtually halted steel production for two days but output rebounded rapidly as roads were reopened.

Cincinnati—No new scrap prices have been announced by the local mill, but higher levels are expected. Best guesses assume that the market will advance at least $2 in the open-hearth grades.

St. Louis—Scrap prices shot up $1 to $5 as mills ended a months-long rein on buying and went into the market to replenish ground stocks which dwindled under continued above-capacity operations. They offered a $2.50 increase on most No. 1 and 2 melting grades. Railroad grades, for which they had been offering a premium, took on an added premium as supplies showed no sign of increasing. The long-inert cast grades also rose under demand of out-of-district melters.

Birmingham—Although the largest district scrap buyer has been out of the market for over a month, open-hearth material continues scarce due to shipments to outside consuming points. Electric furnace scrap and cast are scarce, reflecting increased local consumption.

An Atlanta mill that has been paying premium prices on scrap brought in from outside the district raised its buying price on No. 2 heavy melting to $41, delivered Atlanta. It bought a limited amount of No. 2 bundles at $33, delivered Atlanta.

Los Angeles—Increased purchases of machine shop turnings have strengthened the scrap market. Prices remain steady, although increases in most products are anticipated after the first of the year.

San Francisco—No. 1 cupola cast has moved out of the $47-$48-per-ton price range of recent weeks to a straight $50. The increase reflects improved demand from the foundries.

Seattle—Steel scrap prices remain firm at $44 for No. 1 heavy melting, $40 for the No. 2 grade. Mills are buying in good volume because their inventories are slightly below normal. Receipts are heavy, but are expected to decline during the next 90 days. Exporters are assembling a full cargo at Portland, Oreg., and Seattle for shipment to Japan.

Pig Iron . . .

Pig Iron Prices, Page 185

Pig iron is holding up well, with some evidence of protective covering. Buyers say they see no indications of an early price increase, but that they feel a bit more comfortable with more tonnage on hand. The continued uptrend in cast scrap prices is also stimulating pig iron buying among foundrymen.

While some easing in demand is expected later in the month due to holiday influences, demand so far this fall has been at the year's high in most districts.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 195

The first coke was pushed from Republic Steel Corp.'s new battery of by-product ovens at its Massillon, O., works last week. The battery has a capacity of 183,000 tons of coke annually. The ovens were built on the foundation of an old battery.

Rails, Cars . . .

Track Material Prices, Page 183

The Bessemer, Ala., plant of the Pullman-Standard Car Mfg. Co. is assured steady operation into 1957 by receipt of an order for 1700 freight cars from the St. Louis-San Francisco Railroad. Cost: Approximately $13 million. The road will build an additional 300 cars in its own shops.

Iron Ore . . .

Iron Ore Prices, Page 195

Shipments of 12,243,518 gross tons of iron ore on the Great Lakes in October were exceeded in only one previous October (1952, when 13,013,250 tons were moved). Cumulative movement of ore in the 1955 navigation season to Nov. 1 was 79,865,670 gross tons.

Canada . . .

Iron and steel production in Canada is at record breaking pace. In August, 288,864 net tons of pig iron were produced. This compares with 266,697 tons in July and 166,580 in August, 1954. In the first eight months of this year, pig iron output totaled 2,077,239 tons, against 1,479,055 in the like 1954 period.

Production of steel for ingots and castings in August was 386,730 net tons, against 360,765 in July and 241,504 in August, 1954. In the first eight months, cumulative production was 2,899,059 tons, against 2,105,199 in the corresponding period a year ago.

OVERHEAD TRAVELING CRANE DESIGN ENGINEER

Graduate engineer with substantial experience in design, construction and executive responsibility wanted to take charge of engineering department in overhead crane and hoist manufacturing plant. Mail resume of professional and executive experience, salary requirements, etc., to

Box 349, STEEL
Penton Building
Cleveland 13, Ohio

ENGINEER WANTED

Medium-sized wire drawing mill wants Engineer to take charge of altering present equipment and buildings, and designing new machines, auxiliary equipment and installation. Give experience, background and salary expected in first letter. Replies will be kept confidential. Reply Box 350, STEEL, Penton Bldg., Cleveland 13, Ohio.

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Use the "Help Wanted" columns of STEEL. Your advertisement in STEEL will put you in touch with qualified, high-calibre men who have had wide training in the various branches of the Metal Producing and Metalworking industries.

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Help Wanted

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SALARIED POSITIONS $5,000 to $35,000. We offer the original personal employment service (established 45 years). Procedure of highest ethical standards is individualized to your personal requirements. Identity covered: present position protected. Ask for particulars. R. W. BIXBY, INC., 665 Brisbane Bldg., Buffalo 3, N.Y.

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1—18" or 20" Roll Turning Lathe, to turn rolls single.

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DIRECT CONNECTED SKINNER UNIFLOW ENGINES

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14' x 30'

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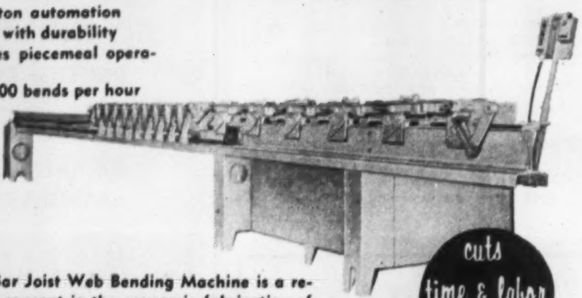

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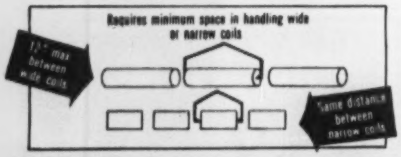
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Advertising Index

Acme Chain Corporation 5
Aetna-Standard Engineering Co., The Inside Front Cover
Ajax Engineering Corporation 41
Ajax Flexible Coupling Co., Inc. 14, 15
Allegheny Ludlum Steel Corporation 69
Allen-Bradley Co. 53, 54
Allen Manufacturing Co. 100
Alloy Metal Wire Division, H. K. Porter Company, Inc. 25
American Chain & Cable, Wire Rope Sling Department 118
American Chemical Paint Co. 156
American Gas Association 56
American-Standard, Ross Heat Exchanger Division 204
American Steel & Wire Division, United States Steel Corporation 59
American Zinc, Lead & Smelting Co. 177
American Zinc Sales Co. 177
Anaconda Wire & Cable Co. 169
Armstrong-Blum Mfg. Co. 77
"Automatic" Sprinkler Corporation of America 115
Automation Engineering Laboratory 191

Bailey, William M., Co. 158
Baker, J. E., Co., The 120
Baldwin-Lima-Hamilton Corporation, Standard Steel Works Division 31
Barry Controls, Inc. 66
Behr-Manning Division of Norton Co. 32, 33
Bethlehem Steel Co. 1
Bijur Lubricating Corporation 145
Birdsboro Steel Foundry & Machine Co. 48
Bixby, R. W., Inc. 201
Blanchard Machine Co., The 64
Blaw-Knox Co. 138
Bliss, E. W., Co. 201
Bliss, E. W., Co., Mackintosh-Hemphill Division 119
Brad Foote Gear Works, Inc. 150
Browning, Victor R., & Co., Inc. 194
Bullard Co., The 44
Buschman, E. W., Co., The 109

Carboloy Department of General Electric Co. 67
Carborundum Co., The 146, 147
Carpenter Steel Co., The 45
Chemsteel Construction Co., Inc. 195
Chisholm-Moore Hoist Division, Columbus McKinnon Chain Corporation 154
Cincinnati Bickford Tool Co., The 51
Cincinnati Gear Co., The 197
Cincinnati Milling Machine Co., The, Process Machinery Division 89
Cleveland Crane & Engineering Co., The 72
Coes Knife Co. 190
Colorado Fuel & Iron Corporation, The 71
Columbia-Geneva Steel Division, United States Steel Corporation 59
Columbus McKinnon Chain Corporation, Chisholm-Moore Hoist Division 154
Cone Automatic Machine Co., Inc. 30
Cowles Chemical Co. 164
Cowles Tool Co. 194
Cross Co., The 105
Crucible Steel Company of America 50
Cullen-Friestedt Co. 202

Dow Chemical Co., The 141
Duraloy Co., The 167

Eastern Machine Screw Corporation, The 194, 201
Eastman Kodak Co., X-Ray Division 171
Eidal Manufacturing Co. 202
Electric Equipment Co. 201
Electric Service Co. 201
Electro Manganese Corporation 195
Electro Metallurgical Co., A Division of Union Carbide & Carbon Corporation 28
Erie Foundry Co. 38
Eureka Fire Brick Works 195

Fairfield Manufacturing Co. 142
Falk Corporation, The 144
Farrel-Birmingham Co., Inc. 60
Federal Bearings Co., Inc., The 11

Fellows Gear Shaper Co., The 152
Firth Sterling, Inc. 90
Fischer Special Mfg. Co. 179
Follansbee Steel Corporation 172
French & Hecht Division, Kelsey-Hayes Wheel Co. 192

Gardner-Denver Co. 166
General Electric Co. 39
General Electric Co., Carboloy Department 67
General Refractories Co. 137
Gisholt Machine Co. 22
Granite City Steel Co. 34
Great Lakes Steel Corporation 94
Gregory Industries, Inc., Nelson Stud Welding Division 168

Hannifin Corporation 162
Harvey Aluminum Sales, Inc. 163
Haynes Stellite Co., A Division of Union Carbide & Carbon Corporation 61
Heald Machine Co., The 2
Hevi Duty Electric Co. 161

Industrial Brownhoist Corporation 58
Industrial Products Suppliers 192
Inland Steel Co. 80
International Nickel Co., Inc., The 78

Johnson Bronze Co. 186
Jones & Lamson Machine Co., Machine Tool Division 8, 9
Jones & Laughlin Steel Corporation 113

Kardong Brothers, Inc. 192
Kearney & Trecker Corporation 107
Kelsey-Hayes Wheel Co., French & Hecht Division 192
Kennametal, Inc. 73
Keystone Steel & Wire Co. 114
Kirk & Blum Manufacturing Co., The 112

La Salle Steel Co. 13
Lavallee & Ide, Inc. 101
Linde Air Products Co., A Division of Union Carbide & Carbon Corporation 24, 70
Logemann Brothers Co. 199
Lovejoy Flexible Coupling Co. 194
Luria Brothers & Co., Inc. 196

McGill Manufacturing Co. 102

Mackintosh-Hemphill Division of E. W. Bliss Co. 119
Magnethermic Corporation 65
Mannesmann-Meer Engineering & Construction Co. 135
Markem Machine Co. 6
Master Electric Co., The 165
Mesta Machine Co. 131
Metal & Thermit Corporation 40
Metallizing Engineering Co., Inc. 203
Michigan Drill Head Co. 63
Midvale Co., The 4
Minnesota Mining & Mfg. Co. 132, 133
Morgan Engineering Co., The 55

National Malleable & Steel Castings Co. 10
National Steel Corporation 94
National Tube Division, United States Steel Corporation 59
Nelson Stud Welding Division of Gregory Industries, Inc. 168
New Jersey Zinc Co., The 97
Niagara Machine & Tool Works 20, 21
Norton Co. 29
Norton Co., Behr-Manning Division 32, 33

Osborn Manufacturing Co., The 3
Ottawa Steel Products, Inc. 197

Palmer-Shile Co. 143
Pennsylvania Flexible Metallic Tubing Co. 159
Pennsylvania Salt Manufacturing Co. 52
Permacel Tape Corporation 57
Peterson Steels, Inc. 151
Pickands Mather & Co. 42
Poole Foundry & Machine Co. 192
Porter, H. K., Company, Inc., Alloy Metal Wire Division 25

Ransburg Electro-Coating Corporation 110, 111
Remington Rand Division of Sperry Rand Corporation 7
Republic Steel Corporation 116, 117
Research-Cottrell, Inc. 46
Revere Copper & Brass, Inc. 129
Rigidized Metals Corporation 190
Ross Heat Exchanger Division of American-Standard 204
Rotary Electric Steel Co. 201
Russell, Burdsall & Ward Bolt & Nut Co. 98
Ryerson, Joseph T., & Son, Inc. 74

Sandusky Foundry & Machine Co. 170
Sciaky Bros., Inc. 17, 18
Sealmaster Bearings, A Division of Stephens-Adamson Mfg. Co. 49
Silent Hoist & Crane Co. 150
Simonds Abrasive Co. 47
Size Control Co. 190
Sperry Rand Corporation, Remington Rand Division 7
Standard Steel Works Division, Baldwin-Lima-Hamilton Corporation 31
Stanley Works, The, Steel Strapping Division 157
Stephens-Adamson Mfg. Co., Sealmaster Bearings Division 49
Sterling Wheelbarrow Co. 162
Struthers Wells Corporation, Titusville Forge Division 188
Sun Oil Co., Industrial Products Department 35, 36
Sun Shipbuilding & Dry Dock Co. 160
Superior Steel Corporation 155

Tennessee Coal & Iron Division, United States Steel Corporation 59
Thomas Flexible Coupling Co. 189
Timken Roller Bearing Co., The Back Cover
Titusville Forge Division, Struthers Wells Corporation 188
Transue & Williams Steel Forging Corporation 23
Tube Methods, Inc. 16
Twin Disc Clutch Co. 12

Union Carbide & Carbon Corporation, Electro Metallurgical Co. 28
Union Carbide & Carbon Corporation, Haynes Stellite Co. 61
Union Carbide & Carbon Corporation, Linde Air Products Co. 24, 70
United States Graphite Co., The, Division of The Wickes Corporation 175
United States Pipe & Foundry Co., Special Products Division 26, 27
United States Rubber Co. 19
United States Steel Corporation, Subsidiaries 59
United States Steel Export Co. 59
United States Steel Supply Division, United States Steel Corporation 59
Universal Cyclops Steel Corporation 201

Ward Steel Co. 200
Westinghouse Electric Corporation 43, 62
Wheeler, C. H., Mfg. Co. 201
Wheeling Steel Corporation 108
Wheland Co., The 200
Whiting Corporation 68
Wickes Corporation, The, The United States Graphite Co. Division 175
Wickwire Spencer Steel Division, The Colorado Fuel & Iron Corporation 71
Wilson, Lee, Engineering Co., Inc. Inside Back Cover
Wolf Co., The 201
Worcester Stamped Metal Co. 190

Yoder Co., The 37

* * *

Table of Contents, Page 5

Classified Advertising, Page 201

tough sprayed metal

well-known maintenance method now profitable production process

equipment fabricators find tough, high-quality sprayed metals build big bonus pay-offs

Modern metallizing—metal spraying—which for many years has saved millions of maintenance dollars by restoring worn machine parts for thousands of companies, is now helping many others improve their products, cut production costs.

In the production of new equipment, tough sprayed metal coatings provide highly desirable mechanical or electrical characteristics at low cost, in high speed, semi-automatic production.

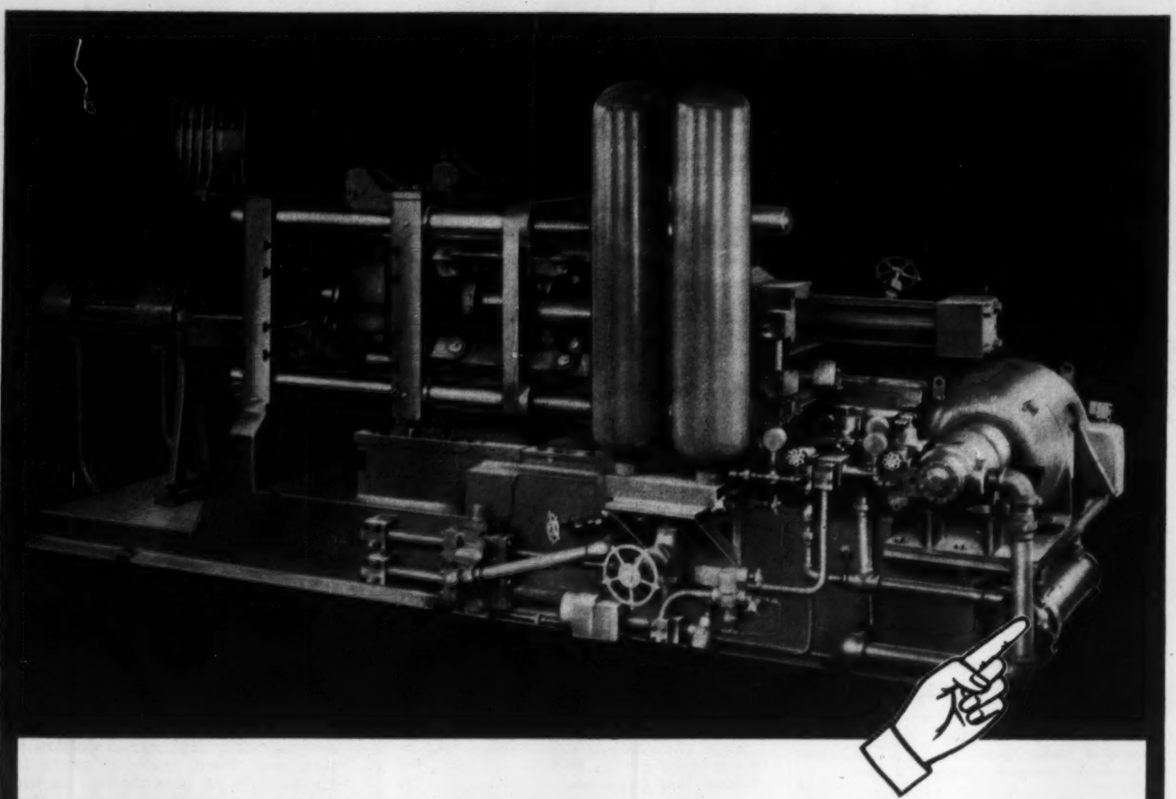
General Electric, for example, a long-time user of metallizing to provide superior wearing qualities on critical areas of large turbine shafting, now applies sprayed metals to a wide range of its products. Many forward-looking companies have instituted investigative programs in their research and design labs to explore the use of metallizing as a means of giving their products competitive advantages in quality, or performance or price—or all three.

Metallizing may be able to help your company improve its products, economically, reduce machine maintenance costs, cut your bills for corrosion protection. It may pay you well to look into it. In any event you will find it a fascinating subject. Bulletin 51 illustrates and describes "Metallizing—its practical applications"—shows actual work being done in users' shops. We shall be happy to send you a copy.

METCO ®

Metallizing Engineering Co., Inc.

1167 Prospect Ave., Westbury, L. I., New York
Telephone: EDGEWOOD 4-1300 • Cable: METCO
In Great Britain: METALLIZING EQUIPMENT COMPANY, LTD. — Chobham near Woking, England



RUGGED, COMPACT ROSS EXCHANGER insures rated power of this B-T die casting machine

There'll be no overheated, thinned oil to cause pump slippage here.

Neatly installed next to the hydraulic pumps of this B-T Cold Chamber Die Casting Machine is a compact Ross Type BCF Exchanger. It provides safe, dependable oil cooling at all times. *Rated hydraulic power is thus insured!*

Says B & T Engineering & Sales Co., "We have used Ross Exchangers for many years and they have proven themselves reliable."

Using past experience as a basis for selection, numerous manufacturers of hydraulic equipment install Ross Exchangers with impressive regularity. Not only are these compact, copper-alloy units top rated for thermal efficiency, but they're ruggedly built to withstand punishing hydraulic shock. Pre-engineered and fully standardized, they're promptly available in a wide range of sizes to answer most needs.

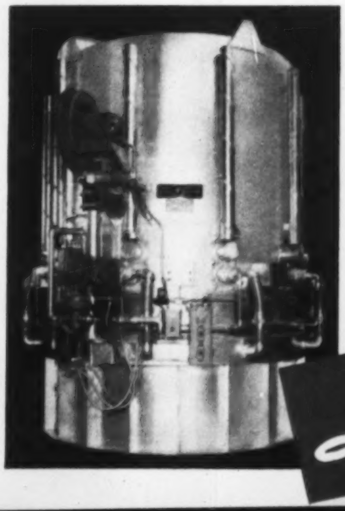
For detailed information, request Bulletin 1.1K5.

ROSS
EXCHANGERS

ROSS HEAT EXCHANGER DIVISION
OF
American-Standard
1431 WEST AVENUE • BUFFALO 13, N. Y.
In Canada: Kewanee-Ross of Canada Limited, Toronto 5, Ont.

Heat . . . under control

. . . *that's the business of* *Lee Wilson*



High heats under exacting control . . . that's the reason why Lee Wilson Single Stack Furnaces consistently do a better job of annealing faster, at lower costs.

The Wilson exclusive "O" Tube has a greater heat input than any tube of its kind yet developed. And, because of the tube design, it quickly transfers this high heat to just the right area of the furnace.

When the heat is released, further control asserts itself. A new diffuser assembly and an extremely effective heat transfer medium direct the heated gases to the coil edges at a velocity that assures most efficient use of all the heat generated.

More heat under closer control—that's the Lee Wilson story—and that's the reason why for the past two years more Lee Wilson Single Stack furnaces have been sold than all other makes combined.

Lee Wilson

ENGINEERING
COMPANY • INC.
20005 WEST LAKE ROAD • CLEVELAND, OHIO

TIMKEN® TQIT roll neck bearings in new United 4-hi, 4-stand mill give interference fit with easy removal

ALAN WOOD Steel Company's new 4-hi, 4-stand tandem cold reduction mill, built by the United Engineering and Foundry Company, uses Timken® 4-row tapered bore tapered roller bearings on the back-up rolls.

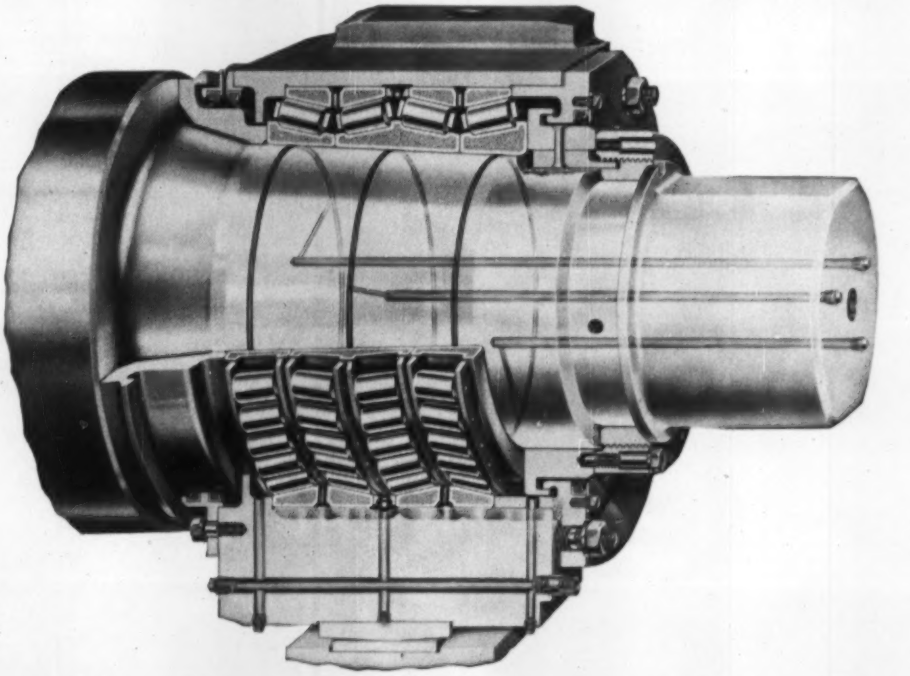
This new roll neck bearing combines maximum bearing capacity and interference fit with easy removal. It can be quickly removed from the roll neck by expanding its cones hydraulically. Excessive scuffing and neck wear are eliminated. The interference fit of the cones with the roll neck provides greater stability between cones and roll neck and gives better load distribution within the bearing. It also permits improved fillet contours and larger necks. Result: lower neck stress and deflections than any other arrangement.

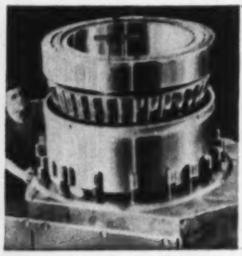
Timken bearings use economical grease lubrication. There's no loss of lubricant during roll changes. Rolls can be changed faster because there are no pipes or tubes. And there's no need for special thrust bearings because the tapered construction of Timken bearings lets them take radial and thrust loads in any combination.

With Timken bearings, higher mill speeds are possible, and starting resistance is reduced to a minimum so there's no roll scuffing or scoring of steel. That's because Timken bearings practically eliminate friction—design, by geometrical law, gives them true rolling motion . . . and they're made extremely accurate to live up to their design.

Get all the advantages of the Timken TQIT bearing in your mill. For more information, write The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.





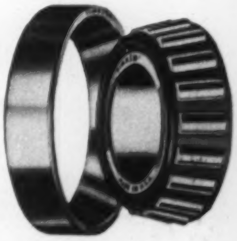
ROLL NECK BEARING ENGINEERING SERVICE

Our field and service engineers have had years of experience with problems of roll neck bearing design and operation. They'll help you select bearings and design mountings. The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis Timken steels.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ⊂⊃ BEARING TAKES RADIAL ↕ AND THRUST →←LOADS OR ANY COMBINATION ✳